Shott, Paul

THE ROLE OF HIGHWAYS AND LAND CARRIAGE IN TSARIST RUSSIA

The University of Oklahoma PH.D. 1982

PLEASE NOTE:

In all cases this material has been filmed in the best possible way from the available copy. Problems encountered with this document have been identified here with a check mark __√__.

1. Glossy photographs or pages _____
2. Colored illustrations, paper or print _____
3. Photographs with dark background _____
4. Illustrations are poor copy _____
5. Pages with black marks, not original copy _____
6. Print shows through as there is text on both sides of page _____
7. Indistinct, broken or small print on several pages __✓__
8. Print exceeds margin requirements _____
9. Tightly bound copy with print lost in spine _____
10. Computer printout pages with indistinct print _____
11. Page(s) _____ lacking when material received, and not available from school or author.
12. Page(s) _____ seem to be missing in numbering only as text follows.
13. Two pages numbered _____. Text follows.
14. Curling and wrinkled pages _____
15. Other _____

THE UNIVERSITY OF OKLAHOMA

GRADUATE COLLEGE

THE ROLE OF HIGHWAYS AND LAND CARRIAGE IN TSARIST RUSSIA

A DISSERTATION

SUBMITTED TO THE GRADUATE FACULTY

in partial fulfillment of the requirements for the

degree of

DOCTOR OF PHILOSOPHY

BY

PAUL SHOTT

Norman, Oklahoma

1982

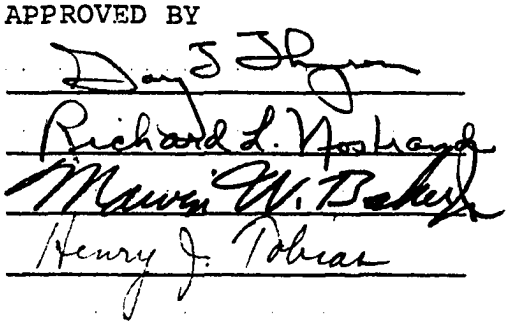
THE ROLE OF HIGHWAYS AND LAND CARRIAGE

IN TSARIST RUSSIA

A DISSERTATION

APPROVED FOR THE DEPARTMENT OF GEOGRAPHY

APPROVED BY



DISSERTATION COMMITTEE

ACKNOWLEDGEMENTS

If it had not been for the encouragement and advice of many friends and colleagues, this dissertation would simply have been another academic exercise. Instead the work became a true labor of love and gave me many insights about land transportation in general and about Tsarist Russia in particular that I had never understood or appreciated. Having been trained in Soviet society first, my interest has now expended into Old Russia, a combination that closed a large hiatus in the understanding of my own Slavic heritage.

These various interests came together in the research topic suggested by Dr. Gary Thompson, a teacher and a friend. Professor Thompson was instrumental in transforming vague concepts into clear, insightful ideas about transportation-economic geography. As my dissertation advisor, he pushed and tugged for historical accuracy and geographical precision without being heavy handed. Then, of course, appreciation is extended to my committee members for their varied expertise on the subject matter.

Dr. Thomas Duffy, Plymouth State College, University of New Hampshire, and Dr. John Windhausen, St. Anselm's College

Manchester, New Hampshire, intellectually stimulated me about Imperial Russia. Mr. Yuri Raskin, a scholar emigre, was indispensable in helping me with the correctness and interpretation of the Russian translations. Moreover, I wish to express my thanks to Kitty Liber, who in a matter of few weeks proofread, edited, and typed the entire manuscript. I am also grateful to Lisa Ritter and Ellen Loiselle who aided in the preparation of the illustrations.

TABLE OF CONTENTS

LIST OF TABLES

TABLES (cont.)

LIST OF ILLUSTRATIONS

ILLUSTRATIONS (cont.)

APPENDICES

THE ROLE OF HIGHWAYS AND LAND CARRIAGE IN TSARIST RUSSIA

CHAPTER I

INTRODUCTION

Transportation in the Economy of Russia

Scholars of Slavic cultures have often used the term nekulturnost ("backwardness")[1] to characterize the way of life in Old Russia. The Russian Empire retained many aspects of a feudal society even during the last part of the nineteenth century. A variety of factors, including transportation inadequacy and inefficiency, inhibited modernization of Russian society. People and commodities circulated within the expansive empire by an assortment of travel modes, but the role of overland transport has been significantly underestimated in the economic and political development of Russia as a nation-state.

Roads and highways have been vital components of all modern societies. Trade and enlightenment are synonymous with efficient thoroughfares. A noted nineteenth-century

---

[1]Literally translated "no culture."

road construction engineer stated, "No country can excel in commerce and arts which is destitute of good roads. . ." (Bartholomew, 1872, p. 314).

This study addresses the character and impact of road transportation in the development of prerevolutionary Russia.[2] It seeks to describe an aspect of Tsardom that has been slighted in the past. The Russian state was faced with extraordinary environmental constraints in organizing, supporting, and sustaining a highway system that could carry summer and winter conveyances in accordance with the type of economic development that was occurring in western Europe. Geographical factors such as size, distance, climate, weather, and other conditions were particular handicaps.[3] The government

---

[2]Imperial Russia in this study is the period from Peter I in 1682 to the end of the reign of Nicholas II in 1917. This study excludes the Duchy of Finland, but Russian Poland is included because of Russia's integration of the territory into the Tsarist Empire.

[3]The primary focus of this research is geographical, but political factors also suppressed land travel facilities. Tsarist governments maintained an interest in keeping the countryside wedded to the traditional patterns of ground carriage and traction. This attitude guided Russia's road program for twenty-two consecutive years in the nineteenth century. From 1833 to 1842, for example, the chief architect for road improvement, Lt. Gen. Toll, was unrelenting about building roads (Seton-Watson, 1967, p. 247). The Minister of Ways of Communications, Count P. A. Kleinmikel, during his tenure from 1842 to 1855, restricted building thoroughfares deliberately on the belief that they only "unsettled morality" of the inhabitants (Almedinger, 1962, p. 117). Moreover, all publications about Tsarist roads and bridges could not be published without permission from St. Petersburg. Censorship on this subject was common policy to most Russian governments (Monas, 1961, p. 181).

in St. Petersburg (Leningrad today),[4] the capital, never fully realized the significance of overland transportation in the advancement of Russian society.

Affairs of government and economic management at most levels of operation in Old Russia were difficult indeed because few or no roads were available. In general, scholars have suggested that the Tsarist state evolved under conditions referred to as bezdorozhnaya or "roadlessness."[5] A major objective of this work is to revise the notion that the Russian Empire was "roadless." Rather, the land was covered with an intricate, reasonably functional, network of dirt roads and weatherized highways. In the course of the study, it will become clear that internal transportation was not stymied, but that it was rather slow, difficult, and inefficient because of low investment in road construction, inept maintenance, and environmental challenges. The study will describe the national road system that emerged and the bureaucracy that attempted to plan, administer, and regulate all facets of overland movement.

Any study of transportation inherently addresses the structure of the economy being studied. In this case, the

---

[4]The modern place-names are given when appropriate.

[5]Bezdorozhe is accurately translated as a road not admitting traffic; "no thoroughfare" (Schapiro, 1958, p. 27). Bezdoroshnaya (the adjectival form) is commonly used to describe a condition of being "without roads." Bezdorozhnost is rarely used.

Old Russian economy is characterized as a distinct variant of European economic development. Russia, on one hand, was well endowed with coal, iron ore, petroleum, forests, and other natural resources, but found, on the other hand, that the industrialization process was cumbersome and expensive. This can be directly attributed to the problems of transportation. Russian-manufactured products were circulated internally with great difficulty, and in the peasants' world, this circulation was virtually nonexistent. The black-earth agricultural region of the southern steppe, once the world's richest grain-growing region, could not effectively feed the country because of an inadequate distribution system. The famines that came with regularity were major crises in the lives of most citizens and raised unanswerable questions about St. Petersburg's ability to organize and govern a reliable economic system.

In the distinctly Russian transportation system, roads and highways played a major role. Yet the seasonal character of highway travel was so embedded that the economic backwardness could not be cured. Industry and agriculture, forced to operate in isolation under extreme physical conditions, incorporated an interesting blend of traditional land conveyances. In the absence of railroads or when waterways were frozen, carts, wagons, carriages, and sledges were indispensable to the economic system. Unique carting and sledge technologies

were devised to meet the local conditions. To compensate for the lack of capital investment and environmental difficulties, Tsarist transportation was structured to depend on the back-breaking labor of the peasantry. The Empire was powered by the sweat and brawn of professional and part-time carriers, mainly peasants who guided millions of vehicles and sleds that carried merchandise and people. Furthermore, the irregular land circulation forced costs of production to high levels. Normal commercial intercourse was greatly impaired, therefore causing economic and social backwardness until the railways began to provide an alternative to Russia's dependence upon the traditional overland transport system.

Over the years, the rail and water modes of Russian transportation have received considerable scrutiny by scholars, but the study of roads and highways has been neglected. At best, the available research regarding land travel is fragmentary and sketchy. Apparently there exists in western scholarship no comprehensive, systematic investigation that focuses exclusively on Old Russia's road and highway system.

Approaches and Organization

The principal study period of this work is nineteenth-century Russia. During that period, travel by foreigners was more freely allowed, and this provided important resource material for this study. Also, official documents, reports,

and statistics are available for this era. Eighteenth-century Russian transportation is very difficult to study, because the accounts are piecemeal. The study ends in 1917, as the Soviet period deserves separate consideration.[6]

Chapter Two is a summary of subjective opinions of travelers regarding their overland travel experiences on Old Russia's roads. The purpose of including these observations is to provide the texture and the flavor of the setting. Chapter Three investigates the methods and modes of land transportation. A variety of animals and vehicles carried products and people to all parts of the Empire. Summer and winter conveyances are described. Public transportation and the development of motoring are treated very briefly. The impact of the physical environment on roadways and travel is the subject of Chapter Four. The relationship between the seasons and road conditions is a critical aspect of the study due to the fact that the majority of Russian thoroughfares were composed of dirt. Travel in the Russian state was, of necessity, based on the seasonal rhythms of climate

---

[6]The administrative organization of Tsarist Russia experienced many changes. In order to maintain consistency and convenience, the guberniias (provinces) utilized are those of the late nineteenth century when they were somewhat permanent. Appendix A gives the name and location of provinces. The voluminous amount of periodicals necessitated a code be employed for efficiency. The citations in the text are abbreviated. Thus, The Russian Journal of Statistics, reads TRJS. A complete list is given in the Bibliography.

and specific conditions of weather. The lynchpin of the Old Russian road network was the system of national Post-Roads described in Chapter Five, but the public highways were not included in that system of travel. Chapter Six reveals the structure and role of the public highways, the most widely used for getting about the countryside. The decline of the public highway system in the late nineteenth century is a major finding in this investigation.

Chapter Seven outlines the principles of road design and engineering. The material in this part of the study shows that Russia was not as primitive in building public highways as was previously suggested. Chapter Eight characterizes the carriage and drayage industry. Much of this information comes from the Russian Census of 1897, the first complete national inventory of the country. The cartage industry is related in Chapter Nine to the overall economic development of Russia. The road system and the cartage industry are placed within the context of economic-geographic theory. The conclusions of the study, Chapter Ten, attempt to draw together the central themes and findings into one general statement about the role of highways in nineteenth-century Russia.

CHAPTER II

PERCEPTIONS OF RUSSIAN ROADS AND TRAVELING

Introduction

Prior to 1830, no weatherized roads were to be found in all of the Russian Empire. To the present time, the extent of improved roads and highways has been limited. Throughout Russian history, the vast majority of roads were simply rutted tracks over which drivers picked their own travel paths. In sandy, marshy, or rugged regions, carriages could not be utilized, and movement was possible only by foot or draught animals pulling small but sturdy conveyances. Cross-country travel that ignored previously used routes was also common. Traversing this system of roads and tracks or blazing new paths in roadless regions was no minor undertaking. Beginning such a journey offered little assurance of arriving at the destination, particularly in the same physical condition. To some non-Russian travelers, it was considered prudent to make a last will and testament (O'Donovan, 1883, p. 5). The old Russian proverb, "You can travel on them for forty days, but won't get anywhere," illustrates the feelings of Tsarist inhabitants about the

road conditions (Collins, 1951, p. 5). An English merchant traveling in the last half of the nineteenth century characterized the best roads as "Looking-glass slipperiness in the winter; unaffordable mud in spring; simoons of dust in summer; lakes of slippery horrors in autumn. . ." (Sala, 1859, p. 170).

Casual travel was not commonly undertaken. Overland movement outside Russia's largest cities and towns was always for commerce and state business or for intrepid adventurers (Murray, 1849, p. 612). Peasants seldom traveled outside their immediate districts and did so only when necessary (NYT, 1883, p. 3).

One way to characterize the conditions of the roads of Imperial Russia is to survey the experiences, recollections, and opinions of local and foreign travelers. Their accounts are important in that personal attitudes provide comments on Russia's painful efforts to achieve social and economic modernization.

Opinions from Foreign Travelers

Very few plaudits were given by outsiders regarding Russian roads and highways. Visitors came for a variety of reasons but the majority were businessmen. Traveling from fair to fair, these merchants were exposed to riding and driving over the Tsar's roadway system.

The most frequently traveled road in the country, the great Moscow Highway between St. Petersburg and Moscow, during the reign of Alexander I (1801-1825), was described by an Englishman as "one of the most painful and tedious journeys in Europe" (Clark, 1816, p. 24). Having had occasion to travel extensively throughout the Empire, Robert Bremmer, on the Trans-Siberian Highway between Vladimir and Nizhni-Novgorod (Gorky today), east of Moscow, castigated Tsar Nicholas I (1825-1855) for such a horrible road:

> Yet this is no by-road; it is the great route to Asia, one of the most important lines of communication in the whole empire. Shame upon the emperor! If he had a particle of true policy about him, he would not have another review, nor build one frigate more, til something efficient has been done towards improving a road which brings more wealth to the country than all his holiday battles and ricketty ships can squander (Bremmer, 1839, vol. 2, p. 200).

Two of Russia's premier thoroughfares, the Moscow and the Trans-Siberian Highways, which were singled out for criticism, represented the overall attitude toward Tsardom's entire road development. The British visitor, George Sala, gave a colorful description of the roadways during the time of Emperor Alexander II (1855-1881):

> The Czar's highway in his two metropolises, in his provinces and his country towns, from north to south--from Karlsgammen, in Lapland, to Saratchekovskaia, in Astrakhan--is the most abominable. I can't call it a corduroy road--the most miserable sack-cloth-and-ashes road that ever was invented to delight

> self-mortifying pilgrims, to break postillions' constitutions, horses' backs, and travelers' hearts (Sala, 1859, p. 127).

Very few Tsarist leaders were praised when it came to their land communication facilities. Sir Mackenzie Wallace, an outstanding British authority on Russian society, described road transportation of the 1870s in the following:

> In Russia roads are nearly all of the unmade, natural kind, and are so conservative in their nature that they have at present day precisely the same appearance that they had many centuries ago. . . . The only perceptible change that takes place in them during a series of generations is that the ruts shift their position. When these become so deep that fore-wheels can no longer fathom them, then it becomes necessary to begin making a new pair of ruts to the right or left of the old ones; and as the roads so commonly of gigantic breadth, there is no difficulty in finding a place for the operation. How the old ones get filled up I cannot explain; but as I have rarely seen in the immediate vicinity of towns, a human being engaged in road repairing, I assume that beneficient Nature somehow accomplishes the task without human assistance, either by means of alluvial deposits, or by some cosmical action known to physical geographers (Wallace, 1877, pp. 13-14).

Opinions from Russian Travelers

The citizens of Russia were as critical about highway transportation as the foreigners. For the most part, important Russians seldom traveled great distances overland except from town to summer homes where

the roads were in good condition.[1] Government officials and merchants had no choice in fulfilling their obligation whereby in cart or sledge they traversed the country.

A noted member of Russia's intelligentsia, Alexander Radishev, while riding on the (unpaved) Moscow Highway in the late eighteenth century, mused about the most important artery in the country:

> The corduroy road tortured my body; I climbed out of the carriage and went by foot. While I had been lying back in the carriage, my thoughts turned to the immeasurable vastness of the world. By spiritually leaving the earth I thought I more easily bear the jolting of the carriage. But spiritual exercises do not always distract us from our physical selves; and so, to save my body, I got out and walked (Radishchev, 1958, p. 46).

The luminary Russian writer, Anton Chekhov, frequently wrote about the roads, especially the Siberian thoroughfares. Traveling some 2,600 miles in 1894 caused Chekhov to berate the highway program of Tsar Nicholas II (1894-1917). They were the ". . .worst roads in the world" according to Chekhov (Hellmann, 1955, p. 216; Hingley, 1951, p. 114). Of the many highways he traveled over, it was the "atrocious Siberian roads" that caused Chekhov

---

[1] In the vicinity of the city of Moscow, the rich and famous lived on estates from 30 to 40 versts (about 20 to 27 miles) from Moscow in the early nineteenth century. (Troyat, 1970, p. 7)

the greatest personal suffering (Hingley, 1951, p. 117). Moreover, Chekhov compared roads east of the Urals to Golgotha,[2] a symbolic reference no doubt to the rugged and perhaps evil character of the Siberian thoroughfares. The major land route to the interior of Siberia was the Trans-Siberian Highway. To Chekhov, it was anything but suitable for wheeled locomotion. His opinion about the road was scathing:

> Imagine a broad lane cleared through the woods, along which stretches on an embankment of clay and rubble some thirty feet wide--this is the highway. If you get a lateral view of this embankment, it looks as though from the earth, as from an open music box, a large roll were protruding. On either side of it there is a ditch. The thing is gutted with ruts a foot or more deep that run lengthwise and crosswise in such a manner that the embankment forms a system of Kazbeks and Elbruzes. . . .[3] Only a clever magician could place a vehicle on this embankment so that it would stand straight (Chekhov, 1954, p. 229).

Chekhov continues his criticism of the Trans-Siberian Highway:

> The going is hard, very hard, but what makes it worse is the thought that this foul strip of

---

[2]Golgotha literally means the place of the skull and was associated with Calvary where Jesus was crucified. It was believed that Calvary, a low elevated hill with numerous caves assumed the shape of a skull (Miller and Miller, 1973, p. 87).

[3]A reference to the mountain peaks in the Caucasus Range in southern Russia.

> land, this pock-marked horror is practically the only artery, we say civilization flows into Siberia. So we say, we say alot. If we were overheard by the drivers, the mailmen, or those wet, muddied peasants walking knee-deep in ooze besides their carts, which are loaded with tea for Europe, what would they think of Europe's candor (Chekhov, 1954, p. 300).

Absence of Roads and Highways

A great number of cities, towns, and villages were inaccessible to road transportation and communications. The operation, for example, of local government was hampered severely because of inadequate roadways. At the conclusion of the nineteenth century, in the Karelia territory, no roads of any kind were to be found. The governor of the province of Archangel described the condition:

> Should any unfortunate official have to visit the various parish administrations, he must do 113 versts[4] or 75 miles on foot, 160 versts or 112 miles on horseback, and 834 versts or 558 miles by boat--making 1,120 versts or about 746 miles in all (Englehardt, 1899, p. 44).

The making of roads as you went along was something to be expected in Russia. In 1870, a journey of 1000 versts (about 663 miles) from Archangel southward encountered 400 versts (about 265 miles) of marshes, 300 versts (about 199 miles) of grass, 200 versts (about 133 miles) of sand, and 100 versts (about 66 miles) of logs (Dixon, 1870, p. 191).

---

[4]One verst is the equivalent to 0.6629 miles or 1.069 kilometers.

Roadless conditions were not only the rule for much of rural Russia but urban districts were also afflicted. The immediate area of Moscow, for example, in the beginning of the twentieth century revealed such a lack of land transportation. Henry Cabot Lodge, a senator from Massachusetts, alluded to the lack of roads:

> Even more striking than the primitive character of the villages is the absence of roads, of which, in White Russia, at least, there are apparently none better than casual cart tracks. One can hardly believe, as the watch indicates approach to the journey's end, that the train is drawing near a great capital of a million inhabitants and a thousand years old. The blank, roadless plain goes up to the edge of Moscow, which has no suburbs; and even when one drives to a pleasure-resort only five miles from the city, that which passes for a road would be thought bad in the most remote mountain districts of the southern Alleghenies (Lodge, 1902, p. 576).

Since natural roads were inadequate and stoned surfaces almost nonexistent, a driver was forced to have "topographical knowledge" of the countryside when making his own roadways (Miche, 1864, p. 230). The following dialogue, for example, between passenger and driver summarizes road building as you went along:

> "I want to go to Evanofsky." "Well," said the yeamshick,[5] "that is the road." "Where, I see no road." "Ah, yes! But I'll find one." And with that he turned the horses' heads at right angle to the straight broad road we were on, lashed, screamed, and succeeded in plunging us across a deep, wide ditch, into what appeared to me to be an endless,

---

[5]State employed post-road driver or postillion, a subject discussed in a later chapter.

> pathless expanse of stubbled and unstubbled ground; tree, shrub, fence, post-house, or hut, there was none to mark the route, as far as the eye could reach (Morley, 1866, pp. 89-90).

Travel across open country was on such "short-cut roads" that seldom cut distance or time (Schuyler, 1876, vol. 1, p. 16). It took a British diplomat 16 days to cover 80 miles, or about 5 miles per day on such a short-cut route (Hume, 1914, p. 117). Travelers would often abandon the journey when the road conditions were intolerable (Wenyon, 1896, p. 15).

Whether driving on a road, track, paved surface, or make-as-you-go path, it was customary to ask the on-coming travelers who had covered the stretch, "Kakova doroga," or "What kind of road is it?" The spirit of traveling dropped considerably if the reply was "plokha," or "bad" (Murray, 1849, p. 41).

Physical Effects of Road Building

Road building during many trips was mandatory, but passengers were susceptible to many other demands, discomforts, and dangers on regular highways. The "dag-bok," or as visitors called it, the "grumbles book," or the "black book," that was required by law to be available to all who rode government post-roads, contained an assortment of road vexations (Murray, 1849, p. 353; Burnaby, 1878, p. 75;

and Miche, 1864, p. 276).[6] The most irritating complaint was the inferiority or lack of horses, but the overall malaise reported was either the bad road conditions, or as the Russians liked to say, "kostolomka," (physical ailments) [7] (Atkinson, 1858, p. 154).

On summer roads it was not uncommon for individuals to break bones or injure skulls due to severe jolting (Custine, 1855, p. 384).[8] Over winter thoroughfares, it was difficult to escape frostbite (Burnaby, 1878, p. 139). Many passengers reported loose teeth, bone dislocations, bruises, and fractures (Holderness, 1827, p. 11; Sears, 1881, p. 593). One traveler said ". . .you should possess a well-knit, muscular frame and good tough sinews. . ." to ride over Russian roads (Wallace, 1877, p. 18). Trying to cope with the rough pavement mile after mile was almost unbearable:

> A bad, rough road. . .will jolt a man's soul out in less than twenty-four hours. . . . I was

---

[6]The complaint book was periodically sent to St. Petersburg for inspection and evaluation by post-road officials. It was one way state administrators gauged the efficiency of post-roads and stations (Holderness, 1823, p. 13). Normally, the district inspector investigated the grievance book monthly (Burnaby, 1878, p. 75).

[7]Kostolomka literally means "bone-breaker." This term was coined during the early years of railway riding when it was considered dangerous (Westwood, 1964, p. 133).

[8]City cab drivers were strapped to their vehicles, not only because of rough pavement, but also to prevent severe jolting or ejection from the conveyance (Bourke, 1846, p. 177).

> so exhausted that I could hardly sit upright; my head and spine ached so violently and had become so sensitive to shock, that I had tried to save my head by supporting my body on my bent arms until my arms no longer had any strength (Kennan, 1891, p. 68).

Because rugged roads effected the digestive system, it was recommended that the passengers avoid rich foods and limit all forms of liquor (Wohl, 1875, p. 4). Those riding on poorly maintained surfaces for any length of time (such as professional post-road drivers and couriers) developed "mental paralysis" and spinal diseases (BEM, 1848, p. 83). A visitor to Russia called the experience of road riding, "spinal omoyvshchie" or spinal crusher (Erman, 1848, vol. 1, pp. 305-306).

In 1889, Governor General Ignatief, riding on the Trans-Siberian Highway between Achinsk and Krasnoyarsk, found the route personally excruciating and ordered the arrest of the contractor who was responsible for the upkeep (Gowing, 1889, p. 228). Generally, travelers viewed Russian highways as a curse to be accepted. "What in all the world could be more dilatory and tortuous than the Russian road," went one expression (Collins, 1951, p. 6). The Imperial road network, paved or unpaved, was ". . . not via mala [but] . . . via diabolica" (Seebohn, 1901, p. 29).

Whereas many individuals complained about the painful effects on the human body, other passengers found the corrugated road surfaces to be invigorating and therapeutic. The

Princess Dolgorouky, in 1796, riding over the part dirt and part log Moscow Highway, had her anatomy jostled to the point where she said, " . . .the motion and exercise not only contributed to allay my rheumatic pains, but to restore the tone of my stomach, and give me an appetite for food." (Dashkaw, 1840, vol. 2, p. 3). Chekhov in 1890 reported that his hemorrhoids, headaches, blood spitting, and coughing disappeared (Simmons, 1962, p. 211). The diplomat and historian Pares received his daily regiment of exercise that aided his hypochondria (Pares, 1961, p. 63).

Psychological Effects. Not only did the travelers have to be concerned about their physical well-being, but mental punishment took its toll on them as well. A real fear and respect for Russian road travel was evident. Depressions and hysteria were commonplace as a result of the mingled feelings of pain, fear, and fatigue. It was said that nervous people should never travel over the Imperial roads (Murray, 1849, p. 371).

Because of these phenomena, many routes acquired odious acclaim. For example, the stretch between Achinsk and Krasnoyarsk, on the Trans-Siberian Highway, a distance of some 22 versts (about 15 miles), had such notoriety. To the local inhabitants it was called Kozoolka (after the post-station Kozulskaya), and the utterance of Kozoolka

brought instant terror to would-be riders (Chekhov, 1954, p. 295). "One becomes so depressed that the mysterious Kozoolka begins to appear in one's dreams in a form of a bird with long beak and green eyes. . ." said Chekhov (St. George, 1969, p. 60).

It was virtually impossible to enjoy a restful night after such a terrible ride:

> If the tourist tries it, only once, he will find it quite sufficient to provide him with food for painful recollection all the rest of his life; and when he has a nightmare, the nocturnal steed will invariably be harnessed to that droshky[9] and will drag him night long over those broken roads. Therefore, be wise, gentle tourist; choose the sledge, or still better -- walk (Whishaw, 1893, p. 178).

The constant jolting also was responsible for hallucinations (Kennan, 1891, p. 255). It was not unfamiliar for long-distance riders to arrive at their destination in a semicomatose state (Marsden, 1892, p. 24). Such mental stress can be appreciated since it was the practice to travel night and day on the Russian post-road system stopping only for changes of horses (Cottrell, 1842, p. 30).

To Russians, riding over the insufficient roads was a reality that one had to accept. Such was the logic of the peasant in saying, "Life is life, a fact is a fact, and if

---

[9] A droshky was a cab used primarily in cities. Rarely was it used for cross-country travel.

nothing can be done about it, it is something to be taken down in one gulp." (Child, 1916, p. 17). When it was necessary to use the highways, the expression, Ne dai Bog, or "God grant we shall never see the like again," was appropriate (Graham, 1913, p. 183). Some people prayed before setting out on a trip (Wallace, 1877, p. 13). To others, the Russian custom of a toast to a safe journey was common (A Lady, 1855, p. 13). "Priyozdom," or on a safe arrival, was the whole point when riding on roads in Imperial Russia (Morley, 1866, p. 14).

In addition to fatigue and injury, there were rosboyniki (brigands) to worry about (Telfer, 1876, p. 123). During the rule of Paul I (1796-1801), groups of armed men were employed by the state to guard important highways (Kotzebue, 1802, pp. 160-61). The entire Trans-Siberian Highway had the reputation of being one of the most dangerous roads in the world because of bandits (Durban, 1899, p. 266). In the first half of the nineteenth century, the most feared section in eastern Siberia because of the highwaymen was the stretch between Irkutsk and Oyog (Burr, 1931, p. 209).

Fast Driving. The ill-kept roads and highways were not the only cause of injury. Injuries were also due to excessive

and reckless speed practiced by Russian coach drivers.[10] It was the rule to hear passengers shout pasholcarashinka (drive fast), or pashol-skoro (drive quickly), as horses and carriage galloped furiously away (Atkinson, 1858, p. 150; Collins, 1864, p. 10). Foreign travelers accustomed to encouraging speed at home were inspired to give Russian drivers vodka to go slower (Marsden, 1762, p. 151).

Alexander von Humbolt wrote of being driven at a breakneck gallop (Botting, 1973, p. 245). It caused Jeremiah Curtin to say, "We went along at a pace like that of toboganning. . ." (Curtin, 1909, p. 68). In 1877, John Bouton, an American, found the pace intoxicating and exclaimed, "What fun! How exhilarating! What novel sensations!" (Bouton, 1887, p. 221).

Fast driving even caused carriages to catch fire. "Our wheels were smoking with their rapidity of their revolutions," said one passenger. Also, collisions were hazards to be blamed on pushing the horses to their extremes (Stephens, 1844, vol. 2, pp. 18-20). The most common cause for highway death was accidents due to excessive speed (TQR, 1841, p. 417).

Horses were no less brutalized because of fast driving

---

[10] A government courier's life span averaged six years and many died of consumption because of riding fast over rough roads continually in service to the state (Venables, 1856, p. 73).

especially in the service of royalty. Peter the Great (1682-1725), for example, would make the journey from Moscow to St. Petersburg in the winter, a distance of 483 miles in n 48 hours of nonstop travel (Hanway, 1754, vol. 2, p. 13). Alexander I accomplished the same trip in 36 hours (Holderness, 1827, p. 191). But the fastest sledge driving by a monarch, and a record, was Empress Elizabeth (1741-1761) who managed to cover the route in 24 hours. In order to travel in this manner, dead horses were left behind. Many foreign visitors were appalled by the carcasses and stench of the dead animals along the road (Marsden, 1762, p. 152).

The desire to defy all obstacles was one rationalization of the necessity to drive thundering horses and carriages over uneven roads or roadless tracks. Nebos (never fear) shouted the fearless drivers. This was part of their character and their attitude about the unknown that lay ahead (TNMM, 1830, p. 409). Perhaps dangerous driving was necessitated by vast distances, boredom, and if the journey was lengthy, a desire to complete the trip before the frost season arrived. Another point of view was that because there was little active sport in the Empire, driving furiously was a form of national recreation (Kohl, 1844, p. 57). Regardless of the reasons for pushing horses at a tempo beyond expectation, when a driver cried out

sevodnaya nilza (today it is impossible) was a welcome relief (Atkinson, 1853, p. 350).

Conclusion

Visitors to the Eurasian state were appalled by the state of affairs of land transportation facilities. To the inhabitants of the Russian Empire, traveling was nothing more than an inconvenience. It was a way of life and nothing could be done about it. Nevertheless, riding over the Imperial Road and highway system was torturous. Overland passage by horse-drawn vehicle, summer or winter, was a journey befitting an explorer. Every trip was an achievement. Great physical and emotional fortitude was required. Drivers and passengers entailed untold hardships and annoyances traveling over endless space that no one, Russian or foreigner, could avoid.

CHAPTER III

LAND TRANSPORT MODES

Introduction

The varieties of pereclodnaya (conveyances) that carried merchandise and passengers over Russian roads were designed to meet rigorous environmental challenges and heavy usage. Animal-drawn vehicles were constructed for durability rather than for comfort. The millions of summer telegi (peasant carts or wagons) and winter sani (sledges), pulled by beasts of the countryside, carried every conceivable product from one part of the country to the other. Through driving rain, slippery mud, and terrible winter conditions, an army of small conveyances was seen on the highways.

Before the introduction of railways and inland steamers, the primitive road network was essentially the only transportation system. Because of the inadequate roads, the few imported automobiles and trucks were relegated to cities or limited to country estates. The motor vehicle did not transform the Russian Empire as it did the western countries at the time of the Revolution of 1917. Public and commercial transportation was still largely by the traditional means of animal traction.

As modern rail and water transportation modes expanded, a new order of commercial life and industrial growth sprang into existence. The railroad, more than any other mode, was the answer to bridging the distances. Inland water transportation carried bulk material. Even with more efficient technology, merchants, industrialists, and peasant carriers had no choice but to utilize the slow and expensive system of shifting goods around by land vehicle when the railways were absent and the waterways were frozen.

The following chapter describes the major forms and methods of overland locomotion and traction by animal-drawn and motor vehicles employed in the Russian Empire.

Traditional Commercial Modes

The principal carriage vehicle of the Empire were telegi. Throughout the country two types of telegi were commonly utilized to transport goods--the two-wheeled and the four-wheeled cart and wagon.[1] Both vehicles were drawn

[1]The telega was of Russian origin. The other nationalities preferred their own vehicle design. The bondkara, for example, was a two-wheeled, oblong structure and conveyed the Finns (Murray, 1849, p. 353). A four-wheeled vehicle with springs, the britska, was popular in Russia Poland (Terra, 1955, p. 292). The madjaar, a four-wheeled wagon was the all-purpose conveyance among the Tatar (Holderness, 1823, p. 228). The arba, a two-wheeled cart was dominant among the nationalities in the Caucasus region (Drake, 1898, p. 205). This discussion is not inclusive of all conveyances due to the number of variety from region to region. Only the most widely used vehicles are discussed.

by a single horse (Hagemeister, 1835, p. 81; Hanway, 1754, p. 947). The two conveyances were considered superior vehicles because they were ideal for rough roads or cross-country travel (Murray, 1849, p. 391). An English merchant, circa mid-eighteenth century, described a typical four-wheeled Russian telega:

> These vehicles are nine or ten feet long, and two or three broad, and are principally composed of two string poles, supported by four wheels of near equal size, and about as high as the fore wheels of our ordinary coaches, but made slight; many of the rounds of the wheels are of a single piece of wood, and open in one part for near an inch; and some of these are not shod with iron (Hanway, 1754, pp. 99-100).

The vast majority of peasants could not afford iron tires, therefore the telega was highly susceptible to breakage from jolting. This caused both buyers and sellers great expense as merchandise, stranded on some road, would be delayed or perhaps not arrive at all. In the first half of the nineteenth century, more than nine out of ten cart wheels were unbound with iron (Soloveva, 1975, p. 27). The same situation continued well into the early twentieth century.

One-horse telegi were necessitated by the narrowness of Russian back roads and the preponderance of crude tracks (Marten, 1906, p. 10). Since two-way traffic was made difficult, it was necessary for one or the other to give way, not always an easy accomplishment (Turner, 1905, p. 128). "When we met a cart in a narrow lane, great maneuvers were needed

to admit of passing," said one nineteenth-century traveler (Yates, 1891, p. 69).[2]

Average loads of material carried by the small two-wheeled cart was 20 to 25 poods[3] (about 720 to 900 pounds). This quantity had to be reduced from 10 to 15 poods (about 360 to 540 pounds) when muddy roads were encountered. The rule was that vehicles could draw only one-half that weight when the road conditions were deplorable (Rubinow, 1905, p. 56). The four-wheeled wagon was considered a heavy-duty conveyance since it was able to haul from one to two tons (Holderness, 1823, p. 90).

The major inconvenience of these small transport vehicles was the restricted capability of carrying large, heavy articles. In this case more carts and animals were required and more trips were necessary than otherwise needed. Russia, being a country of carts, was found to have great numbers of them everywhere. In the early eighteenth century, for example, some three million telegi roamed the countryside (Soloveva, 1975, p. 26). At the close of the Russian Empire

---

[2]Situations like this caused considerable fighting and many altercations along the roadways because of carts and carriages unwilling to give up the right of way.

[3]One pood is equivalent to thirty-six pounds or forty Russian pounds.

in 1917, rural carts and wagons diminished to 2.6 million (Kononenko, 1958, p. 82).

The large number of carts and wagons were responsible for the dirt roads being so badly gutted with deep ruts (Perry, 1716, p. 56). It was out of the question to build larger vehicles, because Russian bridges were notoriously weak, dangerous, or nonexistent (Rubinow, 1905, p. 56). Vehicles with excessive loads were rarely permitted in districts where bridge crossings were required. In the _gubernniia_ (province) of Warsaw, for example, on the Kovno Highway, according to the rules of the Department of Highway Roads and Waterways in 1887, carters were required to get permission from the superintendent if heavily laden carts weighed more than 300 pounds (Snodgrass, 1911, pp. 85-86).

In addition to the common ubiquitous cart and wagon, several other important work conveyances were popular. Siberian settlers were partial to the small, heavy four-wheeled wagon called the _oboz_, which was drawn by a single horse (Kennan, 1891, p. 49). Since these vehicles were used extensively in freight carriage, an _oboz_ came to mean a caravan of wagons and sledges (Stadling, 1893, p. 560). Better off Siberian peasants, _kulaks_, used a _dvukolka_, a two-wheeled cart that was popular until the beginning of the twentieth century. The poorer Siberians had to be satisfied, more or less, with their crude country carts and their

heavy solid wooden wheels. For unusually large articles a heavy-duty cart, the drogi, was required. At different times and places in Siberia, the two-wheeled carts were replaced by more functional wagons (Levin and Potapov, 1964, pp. 151-52).

Winter Freight Modes. Winter frost provided a natural roadway that accommodated commercial sani of many types and shapes. The most useful sankas were the rozvolni, a toboggan-like sledge; the kashenka, a basket weave affair; the posheveni, a wooden body structure. The vozok was an enclosed sledge on metal runners and was used expressly to move valuable items (Levin and Potapov, 1964, pp. 151-52). The narta was probably the most widely used cargo sledge (Sears, 1881, p. 345). With a frame about thirty inches wide, nine to fourteen feet long, fourteen inches high, and weighing only twenty-five pounds, it could not be matched as a mover of products (Lansdell, 1882, p. 261; Hawes, 1904, p. 108; and NS, 1918, pp. 326, 328).

Method of Locomotion and Traction

The normal procedure of transporting goods of the Russian Empire was by oboz, or cartage convoy (Tooke, 1801, vol. 2, p. 17). The entire complement of horses and drivers was procured from the poderatchiki (master carriers). These specialists were seasoned managers of cartage transportation,

and they also negotiated the price of land carriage contracts (Hanway, 1754, p. 103).

To maximize expense and to reduce labor, oboz were organized with one driver in charge of three to four teams of horses or oxen (Stephens, 1844, vol. 2, p. 91). A typical convoy of a single horse pulling a two-wheeled cart ranged from 20 to 100 conveyances that formed a continuous string along the roadway (Smith, 1862, p. 335). A convoy of 100 carts formed a procession of almost one mile (Kennan, 1891, p. 49). It was not unusual for a single freight train to be comprised of 400 or 500 horse-drawn conveyances (Kohl, 1844, p. 410).

Winter oboz were comprised of 15 to 100 freight sledges with each sanka capable of carrying up to 700 pounds (Venables, 1856, p. 121). Winter carriers would drive their convoys regularly for five hours and rest for five hours, day and night. This tactic allowed movement of 50 to 60 versts (about 33 to 40 miles) in 24 hours (Pinkerton, 1883, p. 295). Sledge caravans were led by one or two drivers if less than 100 sankas comprised a train. Two-horse sledges would accomplish about 12 miles per hour with a full load and three-horse sledges about 14 miles per hour (Turner, 1905, pp. 74, 117).

The march of telegi convoys can be appreciated by citing several examples. In the early 1800s, a very crude estimate was that more than 100,000 two-wheeled carts, 200,000 oxen,

and 100,000 drivers were required to carry one million chertverts[4] (about 5.9 million bushels) of grain from south Russia to the Black Sea ports (Bremmer, 1839, p. 489). In the 1840s, the various ruinoks[5] (provision markets) in Moscow were supplied with 9 million poods (about 315 million pounds) of grain that required an army of 450,000 two-wheeled carts and horses including 150,000 tenders (Rubinow, 1906, p. 32). In winter, 50,000 loaded sledges supplied Moscow daily with provisions (Venables, 1856, p. 121). Small wonder that roads were known to have ruts from three to five feet deep in winter or summer (Turner, 1905, p. 125).

Animal-motive traction varied from region to region and season to season. The beasts used to convey products were horses, oxen, dogs, mules, reindeer, and buffaloes (Tien-Shansky, 1928, p. 636). The number of these creatures varied from period to period. In 1916, the number of working horses in European Russia was 18,307,283 (TRA, 1919, pp. 84-87). In some remote provinces it was not peculiar to see goats and pigs harnessed to vehicles (Manstein, 1770, p. 253). If animals could not be obtained, men and women were observed strapped to carts and wagons (Deutsch, 1904, p. 311).

---

[4]One chertvert is the equivalent of 5.96 bushels.

[5]Every large city or town had several market sites that traded different commodities in different sections of the community (Kohl, 1844, p. 48).

Horse-Cartage. Without question the horse was the most widely used animal in carting. This includes drawing public and private carriages, post-carts, and military vehicles (De Tegorborski, 1856, p. 314). The horse, in fact, was so indispensable in Russian life that the government organized horse-breeding districts throughout the Empire to supply the state with workhorses (Wenyon, 1896, p. 193).[6]

The typical Russian draft steed was no ordinary animal. Pulling nearly twenty poods (about 720 pounds) on the average was considered extraordinary for the small-framed horse (Haxthausen, 1856, pp. 374-77). In the winter it was possible to carry three times as much on a sledge (Gautier, 1875, p. 92), but the one-horse sledge had to be rested every sixty miles or so with a load of 500 pounds (Palmer, 1904, p. 131).

It was thought that the best breeds of workhorses were the Tambov, Voronezh, and Bitiug (Haxthausen, 1856, pp. 374-75). The lines of the Novoalexandrov, Limarev, and Potchinki workhorses were also exceptional draft animals (De Tegorborski, 1856, p. 300). It was said that the stamina noted in the Russian breeds was due to genetic adaptation to the

---

[6]In 1900, the state operated six breeding districts: Krenovoya, home of the famous Orloff trotters and farm horses; Janow, near Warsaw, where half-bred horses foaled. There were four in the guberniia of Kharkov; Dirkoul for thoroughbreds, Limarevo for saddle horses, Novo Alexandroff for English half-breeds, and Streletch for Arabians crossed with Limarevo (CLI, 1900, p. 136).

extremes in the climate and the hardships of nomadic existence (CLI, 1900, p. 139).

In the mid-1850s among the millions of peasants or professional carters that either owned or rented horses, the percentages were unevenly distributed. Horse ownership per 100 inhabitants was large in the guberniias that clustered around the Moscow guberniia. The possession quickly decreased in all directions from the central region. An unusual feature was that the St. Petersburg and Moscow governments were opposite in horse concentration. Both provinces were almost similar in population densities, but the St. Petersburg province showed the lowest proprietorship of horses and the Moscow province one of the highest. One explanation perhaps is that outside of the capital city and several large towns, population density was sparse in the St. Petersburg guberniia. Certainly Moscow's superior geographical location, which dominated the trade routes into the interior, required great contingencies of horses to dispense the goods of the state. The black-earth region of south and southwest Russia, long noted for its agricultural supremacy, was not as important in horse ownership as one might expect. It was well known that many southern peasants were poor and horseless. The largest concentration of horses per 100 inhabitants was in the southeast and east. This was to be expected since the Astrakhan guberniia was the terminus of the Caspian Sea

trade and the lower Volga River basin. The fair at Nizhni-Novgorod and upper Volga River basin landing stages required a substantial number of horses. The government of Orenburg was well supplied with horses to shift charcoal, iron ore, and other resources that were depended upon by the Uralian iron center (Figure 3.1).[7]

The relative importance of horse distribution per area was also concentrated in the guberniias located in central Russia, whereas in the outlying governments, the number of horses per province was weak. The large cities and industrial towns were located in the middle part of European Russia, and consequently horses were a necessity that catered to the daily needs of the urban settlements. (Figure 3.2). The city of Moscow was the leading horse buying and selling center in the mid-nineteenth century (De Tegorborski, 1855, p. 301).

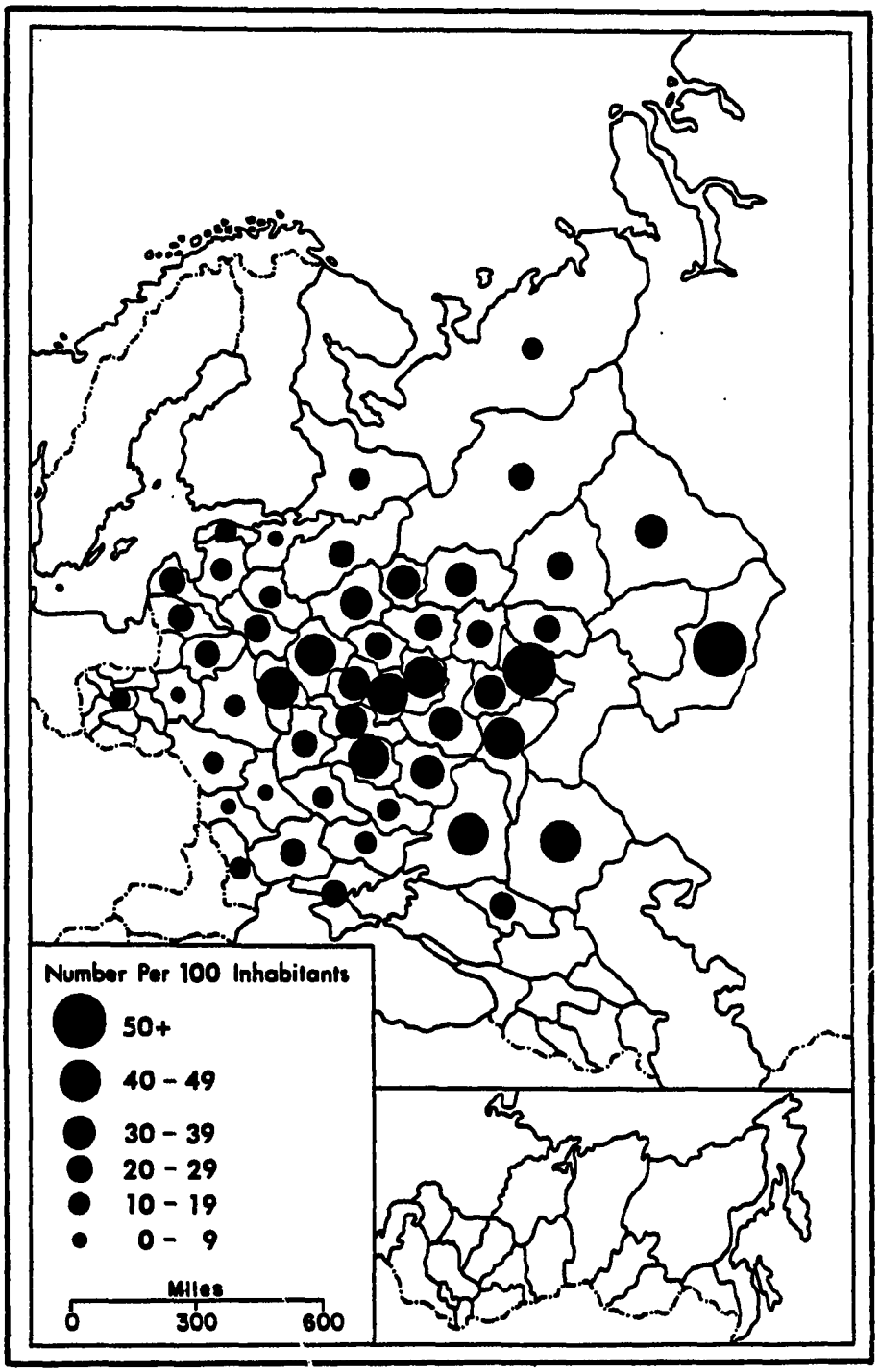
Oxen-Cartage. On the steppes, oxen were favored over horses because of their high tolerance to thirst. Two days without water was not unbearable. They were easily managed and less likely to be frightened by storms and predators (Kohl, 1844, p. 500). Oxen did not tire as quickly from

---

[7]Figures 3.1 and 3.2 exclude the Transcaucasus and Siberian provinces, and Russian Poland is considered to be one geographical unit. No data were given for the Samara and Ufa guberniias.

Fig. 3.1

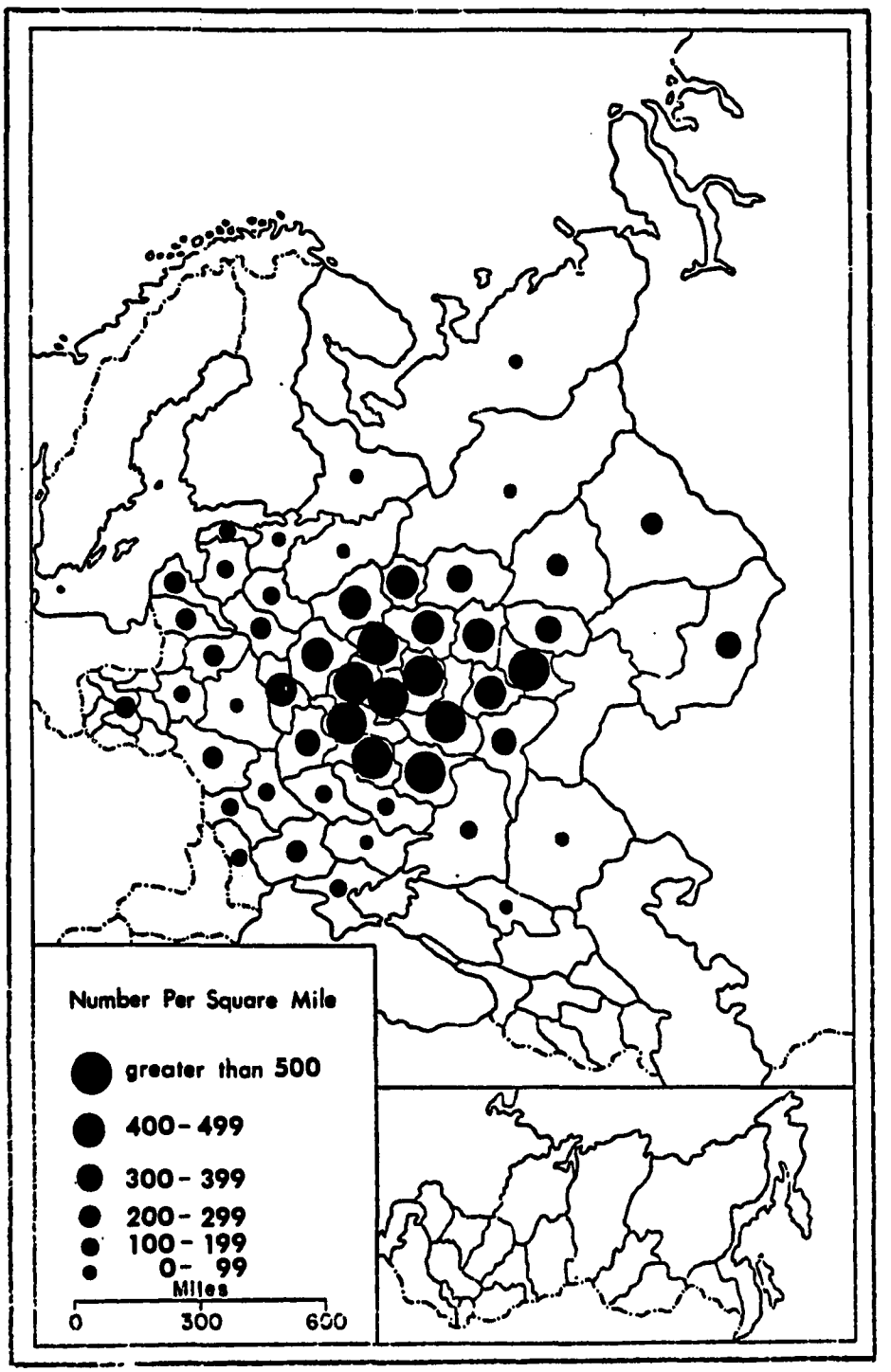
HORSES IN EUROPEAN RUSSIA AND POLAND, 1855



SOURCE: Figures from DeTegorborski, 1855, p. 318.

Fig. 3.2

HORSES IN EUROPEAN RUSSIA AND POLAND, 1855



SOURCE: Figures from DeTegorborski, 1855, p. 318.

heat as did horses (Edwards, 1875, p. 101). Moreover, oxen were able to traverse deep sandy road stretches, whereas horses were useless in such terrain (Lessor, 1885, p. 232).

A serious drawback was their inability to work under prolonged heat. They plied the steppe-roads and tracks only from April to June and from August to October. During July, the hottest period in southern Russia, was when the oxen were idle (Kononenko, 1958, p. 200). Oxen harnessed to carts and wagons were also slow. A team of bullocks managed about fifteen miles per work day if pushed, but six to nine miles per day was the norm (Kononenko, 1958, p. 200; Oliphant, 1854, p. 178).

Despite their limitations, their value to carriers was appreciated because they were able to haul heavy loads. The usual burden of a pair of oxen was from forty to sixty poods (about 1,400 to 2,000 pounds) per cart (De Tegorborski, 1835, p. 111). A team of bullocks could be purchased for 100 rubles in the early 1800s (Holderness, 1823, p. 315).

Dog-Cartage. A good strong team of forty dogs, harnessed two by two, were known to accomplish from forty to sixty miles per day (Sears, 1881, p. 345). A team of eight dogs could pull about 1,400 pounds of goods including two passengers (NS, 1918, p. 320). One dog per sledge could draw about 100 pounds at the rate of eight miles per hour (Colquhon,

1900, p. 76), but it was customary to hitch ten dogs to a narta (Lesseps, 1790, p. 118). Because of their importance in transportation, a mature sledge-dog cost 100 rubles, whereas a puppy would cost only one ruble (NS, 1918, p. 328).

Reindeer-Cartage. In regions where cold and snow duration were lengthy, it was typical to attach reindeer to freight vehicles. A single reindeer-sanka could draw about 400 pounds of merchandise (Jackson, 1895, p. 109). One transport equipage was capable of 3½ to 5½ miles per hour. If relays were used, then 50 to 56 miles per day were possible. It was standard procedure to harness from two to five reindeer per narta, and they were worked about 80 miles per work day (NS, 1918, p. 327).[8] The reindeer, unlike the durable dog, were rested every three or four days, and their usefulness ceased all together after about ten or twelve days of hard cartage (TSGM, 1890, p. 420).

Camel-Cartage. In central Russian Asia and southern Siberia, the burden of animal-motive traction was the chief function of the camel. Camels were seldom employed to pull

---

[8]Among the inhabitants of Siberia, the common measurement was the reindeer verst. One reindeer verst was the same as four Russian versts or about three miles.

conveyances, but the loads were attached to their backs instead. The camel had several advantages over the horse and bullock. They were more adapted to desert conditions, required less food and water, carried heavier weights, and were capable of kneeling down, thus making it less difficult to pack and unpack (Schuyler, 1876, vol. 2, p. 218). The camel was two to three times stronger than the horse (Coxwell, 1917, p. 123). One camel carried from fourteen to sixteen poods (about 504 to 576 pounds) of merchandise (Ermolov, 1893, p. 146).

A camel convoy generally traveled fifteen to twenty abreast in a line at night and in the early morning when it was cool. They fed and rested as they traveled during the hot daylight hours (Burns, 1873, p. 427). Their slow gait averaged 2½ miles per hour (Schuyler, 1876, vol. 2, p. 19). Drivers liked to work them about sixteen hours per day, or approximately 37 miles (Burns, 1873, p. 427; Burnaby, 1878, p. 202).

Traditional Passenger Vehicles

Traveling in the Russian Empire was rarely done for pleasure. The condition of the roads made it laborious and fraught with uncertainties (Elliot, 1838, vol. 1, p. 247).

Carriages and coaches were representative of all spectra of social class and wealth.[9]

By far the most frequent vehicle seen on the highways was the tarantass[10] (Dixon, 1872, p. 189). The tarantass was drawn in the Russian style, the three-horse troika.[11] If the roadways were in poor condition, then as many horses as necessary were added (Stevens, 1891, vol. 1, p. 68). The harnessing procedure, a unique invention, was intricate and designed to raise the carriage over ruts, holes, and other obstructions. In the opinion of one traveler, "No better system exists for rough roads." (Gerrare, 1903, p. 123)

The popularity of the tarantass was because of its sturdy construction that could withstand the jolting and the difficult terrain (Pahlen, 1964, p. 185). The typical tarantass was described in the following way:

> . . .rude, strong carriage of four wheels without springs, suited to its purpose of transit over these rough and jolting roads. The body of the carriage is bourne on two long, elastic poles, which rest on the axles of the front and back wheels. In front is a box for the driver.

---

[9]The stable of the royal family in the late 1840s maintained 1,200 carriages and coaches of all descriptions (Maxwell, 1850, p. 105).

[10]Unlike the Russian origin of the telega, the tarantass was a Tatar invention (Haxthausen, 1856, vol. 1, p. 8).

[11]The tarantass was generally owned or rented by the wealthy class. Peasants used their crude carts or wagons for both a work conveyance and social travel.

> In the carriage is no seat, but passengers, of whom there is room for two, lie on the floor, which is covered with straw, which travellers still supplement with pillows and mattresses for night traveling. Behind is sort of a hood, and the whole back part of the carriage can be cut off entirely by stretching a tarpaulin to the coach box when it is wet. The luggage can be strapped behind (NS, 1918, p. 323).

Russian authorities suggested that foreigners bring the best and strongest conveyances when visiting the Empire (Terra, 1955, p. 286). Visitors soon understood that equipage other than the Russian constructed did not survive the continual jolting or the fast-paced driving. In combination, these forces destroyed non-Russian contraptions (Custine, 1839, p. 249). The constant shaking required that bolts, clamps, screws, and wheels be replaced regularly (Pahlen, 1964, p. 187). Even wheels were wrapped with cord to prevent breakage from the pounding (Stephens, 1844, vol. 2, p. 17).

Although the tarantass was useful for road driving because of its roadability, it was not pleasant for passengers. Count Pahlen called it a "horse-powered liver-massaging device" (Pahlen, 1964, p. 185). Another called it a "four-powered horror" (O'Donovan, 1883, p. 6). Kate Marsden said it all when she aptly referred to it as "Tarantass rheumatism, perpetual internal and external suffering" (Marsden, 1892, p. 78). Disapproval of the conveyance was expressed by Whislaw in an 1883 tune that he

composed from the incessant jolting and sang to the rhythm:

A man must be an errant ass
to drive in a tarantass
(Whishaw, 1893, p. 183)

Winter passenger sledges were of three types: (1) the kachovka, a large open sanka; (2) the vashok, an enclosed long boxlike vehicle; and (3) the pavoska, opened in the front but covered near the back (Gowing, 1889, pp. 43-44). What made the pavoska uncomfortable was its seatless construction (Kennan, 1891, vol. 2, p. 356). Burnaby was not very gracious when he compared the ride in a Russian sledge to like being in a coffin (Burnaby, 1878, pp. 154-55). There was some consolation to winter locomotion in the cramped sledges. In comparison to summer travel, there was a definite absence of severe jolting and a shortened travel time.

Public Transportation. The desire to develop public transportation facilities in Russia was unfulfilled until the nineteenth century. Where public coaches were in use in many European countries in the 1700s, Tsardom's largest cities had none. It was not until 1820 that the first public carriage organization, the Company of the Founders of Diligences on the Moscow Highway (Obshchestvo Uchreditelei Dilizhansov po Moskovskomu Traktu) began service between

St. Petersburg and Moscow.[12] The capitalist enterprise averaged some 3,363 paying passengers per years over a ten-year span (Haywood, 1969, p. 29). The typical public diligence that worked the Moscow Highway was capable of seating from eight to twelve passengers and was pulled by four horses abreast (Murray, 1849, p. 390). In style and comfort, Russian diligences were equal to that of any European public highway vehicle (Sears, 1881, p. 593). Unlike the tarantass they had springs that made the ride more agreeable (Westwood, 1964, p. 19).

The summer fare between Moscow and St. Petersburg in the first half of the nineteenth century was eighty-five rubles (about $44.00) per passenger and six rubles (about $3.00) in the winter. Depending upon road conditions and weather, the diligences rolled along at eight or nine miles per hour (Murray, 1849, p. 390). When the road was weatherized with stone, the public coach required 73 to 96 hours in the summer and 65 hours or less in the winter to make the 450-mile journey. By government post-cart, the trip required 60 hours, about 13 hours less than the diligence (Murray, 1849, p. 391;

---

[12] Taxi service was available in the fifteenth century in certain cities. A Traffic Decree was issued by Prince Ivan III of Moscow in 1497. It stated the fare for a hired horse-carriage. Coach men had to have horses of a specific color and vehicles of a specific shape so that they could be easily recognized on the congested streets (SW, 1981, p. 15).

Stephens, 1844, vol. 2, p. 94). Although public transportation did a brisk business in north-central Russia and between Baltic and Polish cities, public travel in southern Russia was less developed. Two weeks might pass before a single passenger inquired about passage to Moscow from Kiev (Stephens, 1844, vol. 2, pp. 24, 44).

To enhance the treasury, the government, as an entrepreneur, began to facilitate public transportation. It organized the Department of Post Coaches (Otdolenie Pochtovykh Karet i Brik). The state maintained 10,425 versts (about 6,912 miles) of post-roads[13] that passengers were allowed to traverse in a government vehicle in the early 1850s (Haywood, 1969, p. 31). The mail-post always had road priority over all other vehicles, consequently their locomotion was speedier than that of the public coaches (Stephens, 1844, vol. 2, p. 44). For twenty rubles, the passenger in the mail-cart made the journey between Moscow and St. Petersburg in about 48 hours of nonstop posting (Murray, 1849, p. 393).[14]

---

[13]The Russian post-road and system of posting is discussed in a later chapter.

[14]The train between Moscow and St. Petersburg in the last half of the nineteenth century made the journey in twenty hours and cost nineteen rubles (about $10.00) per person (Fetridge, 1867, p. 563).

When railway construction began to connect cities, both the public and government passenger operations suffered. This forced the private stagecoach companies to abandon their lines and the government service to carry people to the out-of-the-way districts.[15]

The Carriage-Building Industry. Efforts to develop and improve Russia's overland transportation faced formidable obstacles. Nevertheless, it was impossible to travel anywhere in the vast country without some form of vehicular locomotion. Whether in old or modern Russia, the construction of wheel transportation conveyances represented an important industry.

The official statistics of 1897 showed that the Russian Empire employed 14,431 wage earners as carriage builders

---

[15]Intracity public transportation was just as poorly developed as intercity communication. Municipal transportation was first opened in Moscow in the mid-1800s and was called "lineikas" (lines). Fifty horse-drawn summer and winter vehicles with seats on either side were available to the paying public. In 1872, the lineika operation was replaced by horses pulling a vehicle over rails. This was called konkas and was the prototype of the modern tram. Fees were high and the locomotion slow. The konka traveled 4-5 miles per hour. In Moscow, the first route was between Iverskie Vorota (near what is now the Museum of History) to Smolensky (now the Byelorussian Railway Station). Sixty miles of konkas traversed Moscow by 1900. In 1899, Moscow's first real tramway system was laid connecting Strastnoi Monastery (now the area of Pushkin Square) to Butyrskaya Zastava. Before 1917, Moscow had no bus or subway system (SW, 1982, p. 5).

(including wooden river structures). Approximately 12,600 coach makers were located in European Russia, 438 in Russian Poland, 661 in Transcaucasus, and 732 in Siberia. The distribution of carriage artisans by guberniias showed a correlation between the provinces with large cities and the concentration of employed workers in coach making.[16] Every province had at least one full-time laborer, but the majority of the guberniias contained 100 or more skilled professionals. Only three governments, St. Petersburg, Novgorod, and Moscow enjoyed more than 1,500 but less than 2,000 craftsmen to provide the population with land vehicles. Even treeless southern Russia had a reasonable supply of workers designing and fashioning overland passenger conveyances. The superiority of the Warsaw province over the other Russian-Polish provinces in the manufacturing of animal-drawn carriages, was due in large part to the industrial and urban development centered in the city of Warsaw and the outlying industrial towns. The districts of Tiflis, Baku, and Kutai led all other administrations as the coach assembly centers in Transcaucasus. The distribution of carriage labor in Siberia

---

[16] The Census of 1897 did not separate carriage workers from boat builders. They, in all probability, assembled in both modes. It was assumed that diligences, post-carts, taxicabs, and private carriages were built. The shops probably also put together carts and sledges for special orders or when business was slow. See Appendix B.

per guberniia was congruent with the population clusters. Inhabitants were able to purchase family conveyances if they resided in either the Primorski or the Tomsk provinces. (Figure 3.3)[17]

Modern Transportation Development

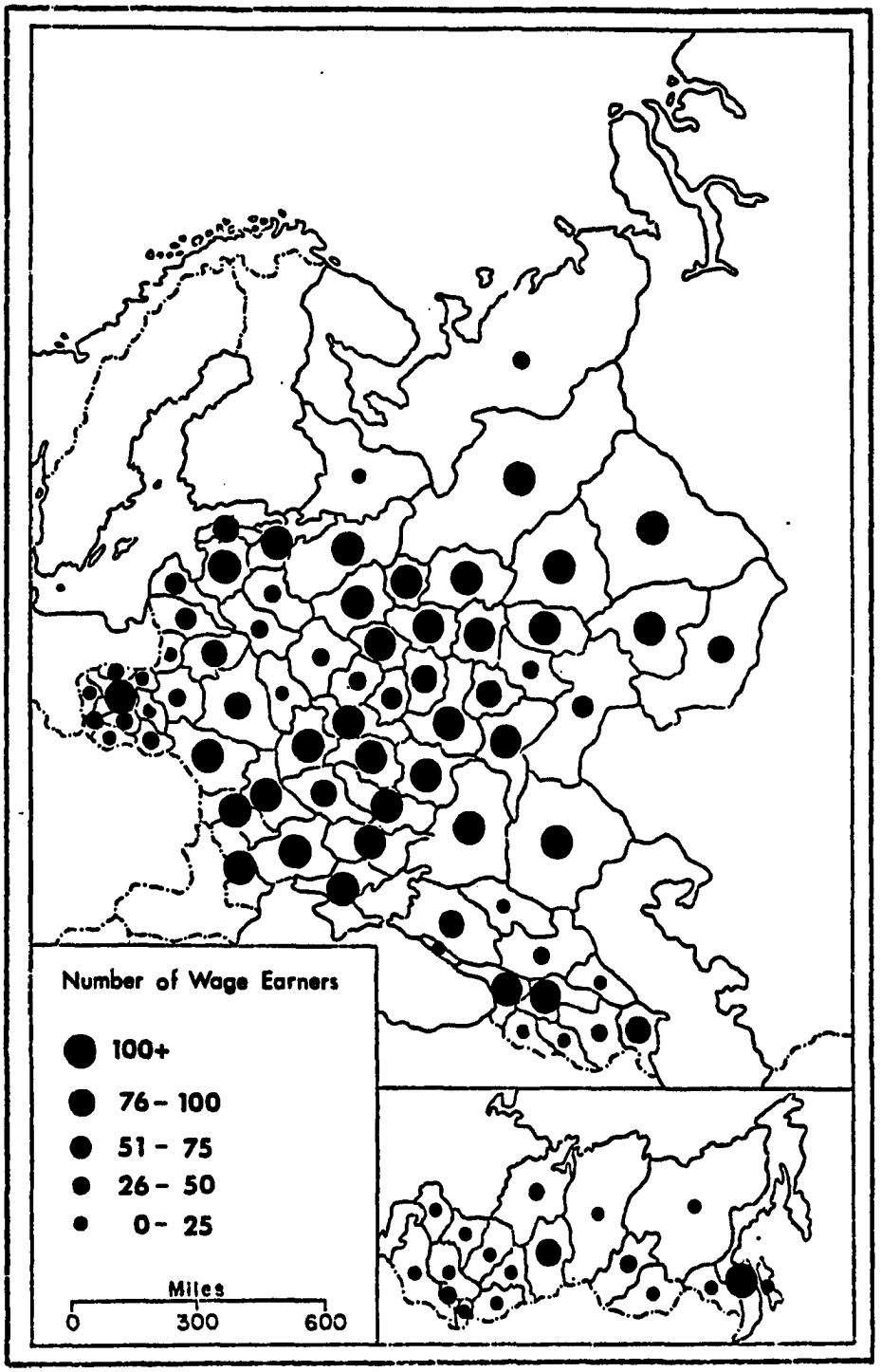
Because of the interdependent relationship that existed between good roads and communication, the internal combustion engine was important to the development of ground transportation. In Tsarist Russia, the implementation of horseless vehicles was long and slow and done with considerable opposition from the powerful segments of society. In 1913, Tsar Nicholas II banned all automobiles in the Crimea (Kochan, 1976, p. 179). The country people viewed the automobile with suspicion (CR, 1905, p. 246). This was perhaps because of the typical distrust that the Russians had of new equipment and innovation. One top official said in reference to the automobile, "Novelty brings calamity," and that the motor vehicle was not appropriate in the Empire (Stoddard, 1899, vol. 6, p. 52).

One of the greatest drawbacks of driving, other than the acknowledged lack of paved highways, was the severity of the climate. The automobile would only be useful in the months

[17] In 1893, the capital city of Tomsk produced over 50,000 winter and summer vehicles (Wenyon, 1896, p. 206).

Fig. 3.3

MANUFACTURE OF CARRIAGE VEHICLES, 1897
(including wooden vessels)



SOURCE: Tsentralnyi statisticheskii komitet. Vols. 1-89. St. Petersburg, 1899-1904.

of May, June, and August, when the dirt roads were dry and hard. It was out of the question for motor vehicles to be on the roadways during rasputitsa. Gasoline stations were rare in most parts of European Russia and were found only on the highways that connected St. Petersburg, Moscow, Warsaw, and Kiev. The average distance between gas stations was 124 miles (Baedeker, 1914, p. xxv). The few motorcars in Siberia acquired fuel and oil by dog and reindeer cartage (TLD, 1908, pp. 199, 377).

Although it was possible, but difficult, to overcome many nuisances due to inferior roads and climate obstacles, it was a different story when it came to bridges. The majority of bridges in Tsardom were regarded as dangerous for automobiles (TLD, 1908, p. 59). Furthermore, the government never saw fit to establish road and highway regulations for motoring because of the lack of motor vehicles (Baedeker, 1914, p. xxvi).

The pioneer Russian motorist, A. W. Bronstein, believed that if automobiles were to have a future in Russia, it was essential that they have gas tanks capable of holding enough fuel to travel 300 or 400 miles in open country and that a magnetic electric ignition system be made mandatory (THA, 1913, p. 7; CR, 1905, p. 247). It was further suggested that passenger cars should have high road clearance, strong springs, and sturdy running gears to withstand the uneven

and hard pavement of dirt thoroughfares (THA, 1913, p. 7). A special Russian commission said in its report that motor vehicles should include the following specifications: (1) they must have powerful engines, (2) large twin wheels, (3) specially strong frames, and (4) models should be simple to repair (TA, 1917, p. 106).

The world ownership of passenger cars in 1916 was estimated at 3,114,000. The United States registered 2.4 million, about 77 percent of the total car ownership. The Russian Empire claimed a pitiful 15,360 and was far behind Great Britain, France, and Germany respectively (THA, 1916, p. 114).[18]

Russian Development. Despite the paucity of motor vehicles in the Russian state, Tsardom could claim to have a modern but small automotive industry. In 1903, a Russian auto works assembled 24 motor vehicles for the state post-office and another 14 vehicles for mail delivery in St. Petersburg (THA, 1903, p. 588).

Before World War I, there were about 1,500 iron and steel works and engineering plants in Russia out of which seven

---

[18] The Soviet Union at the end of 1979 claimed 1,313,000 private automobiles (SW, 1979, p. 4).

were engaged in motor vehicle production and assembly (THA, 1911, p. 114). The Moscow-based Baltic Engineering Works[19] were turning out 250 to 300 vehicles per year (Sutton, 1968, pp. 243-44). The Russian Baltic Factory (Sikorsky) in Riga was producing 300 to 500 vehicles per year (Koutznetzoff, 1916, p. 422). In 1915, American technicians refurbished the AKT Obs Vozdukhoplavanie (Yaroslavl) factory in order to produce 1,500 Wolsey and Crossley automobiles annually (Sutton, 1971, p. 179). It is worth mentioning that Russia was the first country to develop the army's mobile field kitchen that could feed about 500 troops per meal at one time (Polster, 1915, p. 290). Table 3.1 shows Russia's important motor vehicle industry.

Conclusions

Practical considerations of traditional and modern transportation modes were influenced by inadequate roads, streets, and bridges including physical constraints. The carriages, carts, and sledges were built to be sturdy and reliable rather than comfortable and stylish. The majority of carriers were small and hauled limited weights. This, in

---

[19] After 1917, the plant was renamed Automobile Works No. 2, and today is known as ZIL-Plant im. A. Likhachev (Sutton, 1971, p. 175).

TABLE 3.1

RUSSIAN MOTOR VEHICLE MANUFACTURERS
PRIOR TO 1917

NAME	LOCATION	DATE
AMO--Baltic Engineering Works	Moscow	----
Sikorsky--Russian Baltic Wagon Factor	Riga	1899
Yaroslavl--Akt Obs Vozdukhoplavanie	Yaroslavl	1899
Sevronsky--Sevronsky	St. Petersburg	1901-05 and 1911-15
Tansky--Tansky	St. Petersburg	1901-05
Penza--Autotrust	Moscow	1906-10
Leutner--Leutner and Co.	Riga	1911-15

SOURCE: Compiled from Doyle, 1931, p. 67; 1957, p. 122; Kouznetzoff, 1916, pp. 421-22; Sutton, 1971, p. 179.

turn, necessitated many more carts and wagons to transport products for any distance.

Public transportation only came about when the roads were paved but soon lost favor to the faster and cheaper railways. The traditional means of locomotion also supported a substantial carriage-building industry in all parts of the Empire. Many roads, especially in the remote provinces, could not support modern motor vehicles and were out of reach to the average inhabitant.

Despite the sorry thoroughfares, a small automobile industry was spawned. For the most part, when other countries were modernizing their land transportation systems, the Russian Empire was dependent upon horses, oxen, and other draught animals for their day-to-day transportation.

CHAPTER IV

EFFECTS OF SEASONALITY AND ENVIRONMENT ON ROAD TRANSPORTATION

Introduction

Land transportation in Russia was strongly influenced by the physical environment. Climate and weather were particularly significant factors. There was a close relationship between the collection and distribution of goods as well as social intercourse to rain, mud, dust, frost, and snow. Winter was a severe time of year, but certain advantages accrued from snow-road transportation. In spring and autumn, ground travel was heavily influenced by rain, snow-melt, and subsequent muddy conditions.

Firm, hard roads and uninhibited travel fostered the economic well-being of communities. When thoroughfares, natural or paved, became difficult for animal and vehicle traction, a whole range of minor annoyances and major bottlenecks occurred. Draught animals perished by the score and human life was endangered. Stymied cartage caused abandonment and damage to merchandise. Agriculture and industry were threatened. Prices and wages were altered. Large and small

villages and hamlets containing millions of inhabitants were cut off from civilization.

The day-to-day dependence on the ability of the carts and sledges to move unrestricted was a major feature in the economic and social development of Russian society. This chapter characterizes the influences of the natural setting, especially climate and weather, on ground locomotion and travel.

Dimensions of Cold Weather

For economic efficiency and cost, winter was the most favorable season of the year for transporting the wealth of the country (CR, 1891, p. 193). It was also the occasion for social get togethers. Friends traveled hundreds of versts during the winter because summer traveling was too difficult (LLA, 1851, p. 250). Frost, snow, and ice were literally an economic advantage to businessmen and land carriers.[1] Had it not been for winter, commodities could not have been distributed to the distant interior cities and settlements, nor raw materials and finished products converted into money at the marketplace (Tooke, 1801, vol. 1, p. 19). An immense economy of force was generated expeditiously over

---

[1]Winter-roads in southern Russia were used sparingly because snow conditions were not as predictable as in the north. It was in the summer that the roads were important (Brown, 1884, p. 173).

white-roads rather than over brown-roads (Gautier, 1875, p. 92).

Sanka transportation was surpassed in efficiency only by rail service (Sears, 1881, p. 211). Rivers and canals were unreliable due to annual freezing and physical barriers. Consequently, many merchants preferred to wait for frost conditions than to risk unsafe water passage (Ravenstein, 1857, p. 563).[2] Nonetheless, when winter closed the telegraphy service by raging storms, it was then that the frozen highways provided all such communications.

In other countries of Europe, winter was generally a quiet part of the year, but in Russia the cold season was alive with nomadic activity. Tens of thousands of peasants entered the land carriage trades when agriculture was impossible. This in turn created conditions that offered businessmen and brokers economic rewards. Russian cities bustled with winter conveyances. In the last half of the nineteenth century, St. Petersburg's streets and suburban roads accommodated 30,000 sani and Moscow two-third's of that number (Knox, 1870, p. 436).

Since wages of drayage workers were low because of excess teamsters and the ease of overland transport, goods

---

[2]Nearly five percent of all merchandise shipped by barge was lost due to water impediments (Westwood, 1965, p. 565). The major faults were low water, shoals, and rapids (Clarke, 1816, vol. 1, p. 454).

were less expensive in the winter than in the summer. Because of this situation, the coming of frost and snow was declared the "Contract Season" among ofeni (traveling merchants).[3] It was the time when buyers and sellers consummated trade agreements and delivery contracts (Brandt, 1822, p. 2; Kropotkine, 1892, p. 86). This concept continued into the early twentieth century when numerous "contract-fairs" (emphasis added) were held during the winter in strategic areas of the Empire. Traders from all over the world attended these fairs to purchase the past season's goods (CR, 1911, p. 532). The largest fair in the world, during the last decade of the nineteenth century, was held in Nizhni-Novgorod. Every year an average of 200,000 merchants arrived at this immense trading event. The fair was conducted three times a year. The winter fair, held in January, traded in toys, wooden boxes, lumber, and crafts. The buying and selling of horses took place in July, and general merchandise was sold in August (Buckley, 1886, p. 272).

Not only did large and small ofeni throughout Russia make efforts to purchase, accumulate, and store manufactured goods and raw materials during the cold season, but peasants as well participated in the unusual practice (DBR, 1854,

---

[3]In the last quarter of the nineteenth century there were 681,116 registered traders conducting Russia's internal commerce (Kropotkine, 1886, p. 86).

p. 541). The necessity of storage in winter was understood by the natives, but outsiders thought this behavior rather peculiar. Henry B. Stacy, the American Consul in Russia, stated in 1862, "The idea of piling up and holding for one-half or two-thirds of a year the products of an Empire is simply absurd." (CR, 1862, p. 332) Unfortunately the diplomat did not understand Russia's condition of roadlessness that was more noticeable in summer than in winter.

The delivery of meat in winter was also important. The large cattle drives that originated in southern Russia as far as 1,000 to 1,500 versts (about 663 to 994 miles) from northern markets started in autumn. The cattle were butchered along the road when frost set in and carried to the cities frozen in sledges (Johnston, 1816, p. 208). Furthermore, the massive movement of the southern corn trade to Baltic ports was conducted during the winter (Kohl, 1844, pp. 363-64).

Another attractive feature of winter land carriage was the inexpensive carting. The main reason was the technical relationship between sledge and snow. The sanka encountered less road resistance with iron runners over snow, than wheels met over dirt. The resistance ratio of locomotion to weight for a sledge on iron runners over packed snow-roads was 1:300. The friction ratio of a wheeled conveyance over soft or hard summer-roads ranged from 1:5 to 1:28, therefore more goods and heavier loads could be moved and pulled easily

(Tannenbaum, 1898, p. 807). Despite gliding ease, caravans of freight sledges moved slowly. Freight trains on the Moscow Road, averaged about 70 versts (about 46 miles) per 24 hours with several rest stops (Hanway, 1754, vol. 1, p. 58).

In the middle of the eighteenth century, cartage costs from St. Petersburg to Tsaritzen (now Volgograd), a distance of about 1,193 miles, was about forty kopecks per pood, but in summer it jumped to one ruble (Hanway, 1754, vol. 1, p. 100). Not even water carriage at this time was able to compete with winter sledge rates (Oddy, 1807, p. 71).[4] In the 1800s, freight expense for one pood of merchandise from St. Petersburg to Moscow over the (unpaved) Moscow Highway, a distance of about 370 miles, ranged from 60 to 70 kopecks in the winter but soared to 2½ rubles per pood in the summer (Haywood, 1968, p. 28). As a rule, winter cartage was one-half the cost of summer land transportation (Knox, 1869, p. 291).

Winter-Road Characteristics. The frozen highways and byways began to get crowded in early November when the ground

---

[4]The advantage of river transport over drayage was volume and not cost or time. For example, rye shipped to the Baltic region by barge in the 1830s sold for 4 rubles per pood, but in Saratov the same sold for 98 kopecks at the source (Westwood, 1964, p. 26). Despite the fact that land carriage was five times more expensive than rail carriage in the mid-1800s, road users continued to move products over the highway system (TEM, 1881, p. 259.

was hard and the snow had accumulated (Haxthausen, 1856, p. 329). Good winter-roads depended upon several factors. The soil had to be frozen several feet deep before the snow remained on the ground (Castera, 1800, vol. 1, p. 10). Snow-roads were generally available as long as cold temperatures accompanied periodic snowfalls, but frigid conditions necessary for snow cover were never uniform over the massive country. The ground in far northern Russia, for example, froze to a considerable depth and sledge-roads were used for many months, whereas in central and southern Russia, the base for frozen roads was not very firm.[5] In the far south, occasional snows did not last long. Winter travel in this part of the Empire was questionable.

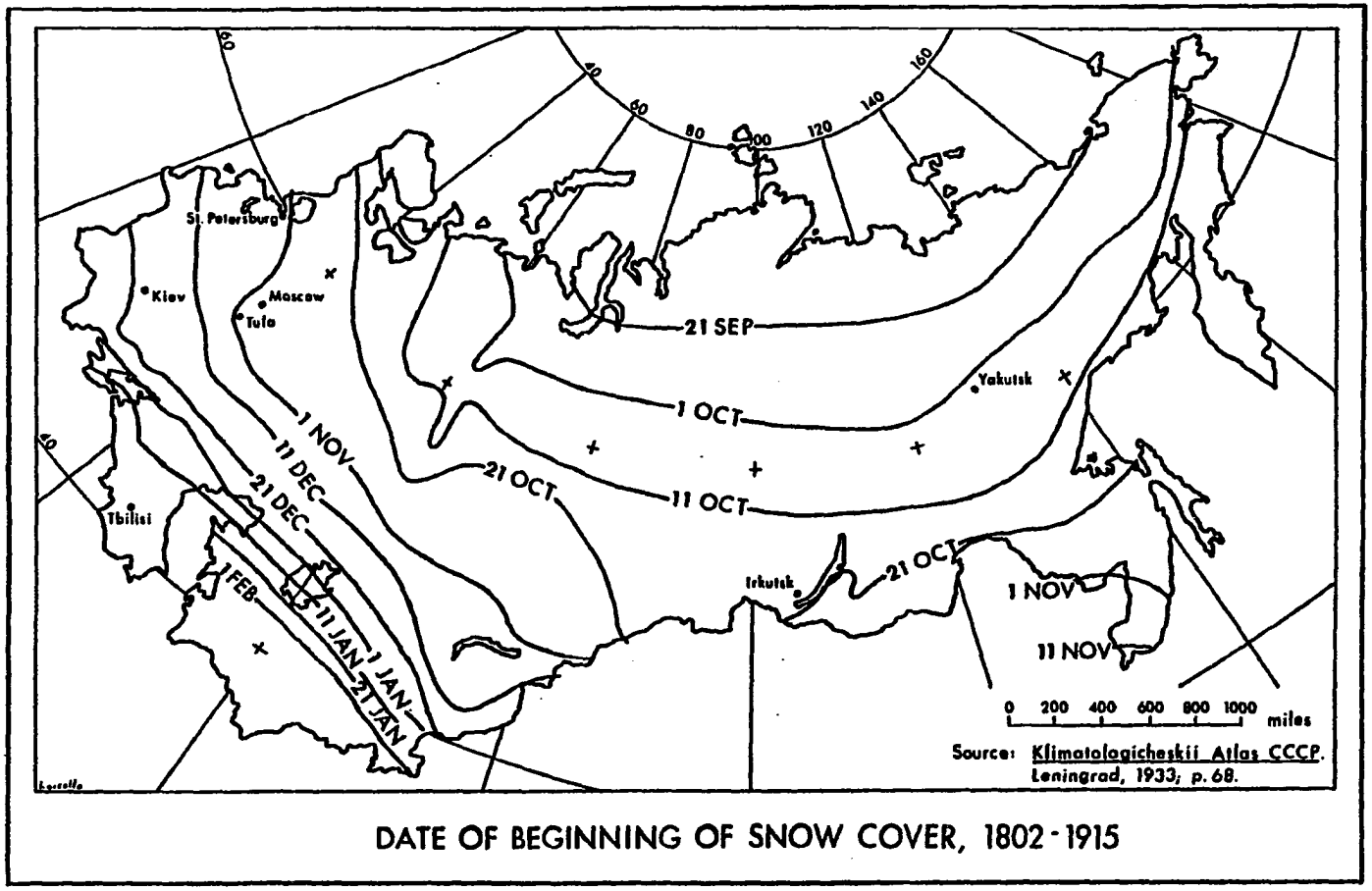
Owing to the great extent of land, the north latitude position, and the lack of major physical barriers, the climate in Russia was characterized by continentality, or great extremes between winter and summer. Observations extending over a century, from 1802-1915, show that the progression of snow-covered roads varied with latitude from north to south. Snow began to fall about mid-September in far northern Russia, around the Ob River delta and extended east and northeast into Siberia. Here the inhabitants of reindeer

---

[5]The Baltic Germans called sledge-roads bahn (Rigby, 1842, vol. 1, p. 165).

and dog cultures got an early start in winter cartage while the natives in other sections of the Empire were still on wheels. Two months later, the roadways in a wide corridor from St. Petersburg southeast to Moscow and continuing into central Siberia became white in early November. A week or so later, snow-roads were available to travelers and carters in guberniias that stretched from Russian Poland in the west to the southern black-earth provinces and the region of Central Asia. The Crimea, northern Caucasus, lower Volga River, and extreme southern Siberia districts did not receive snowstorms until late November. By December, however, air masses bearing snow covered all roads and highways in most sections of the Empire with the exception of a small area on the eastern shore of the Black Sea where winter cyclones and Arctic air do not penetrate. (Figure 4.1)

The relationship between the permanent winter-road conditions and snowfall was connected to the cold temperatures. The roads during the early snowstorms were not yet sufficiently frozen to make gliding and passage satisfactory. The ground was still too warm for snow to remain permanently. At this time, snow-roads were quickly converted to slush, water, and mud. Only when cold, frigid Arctic air moved southward did highway travel start for the winter, and as a rule, travelers did not particularly venture out in the newly fallen snow. Permanent winter-roads developed from north to south.



DATE OF BEGINNING OF SNOW COVER, 1802-1915

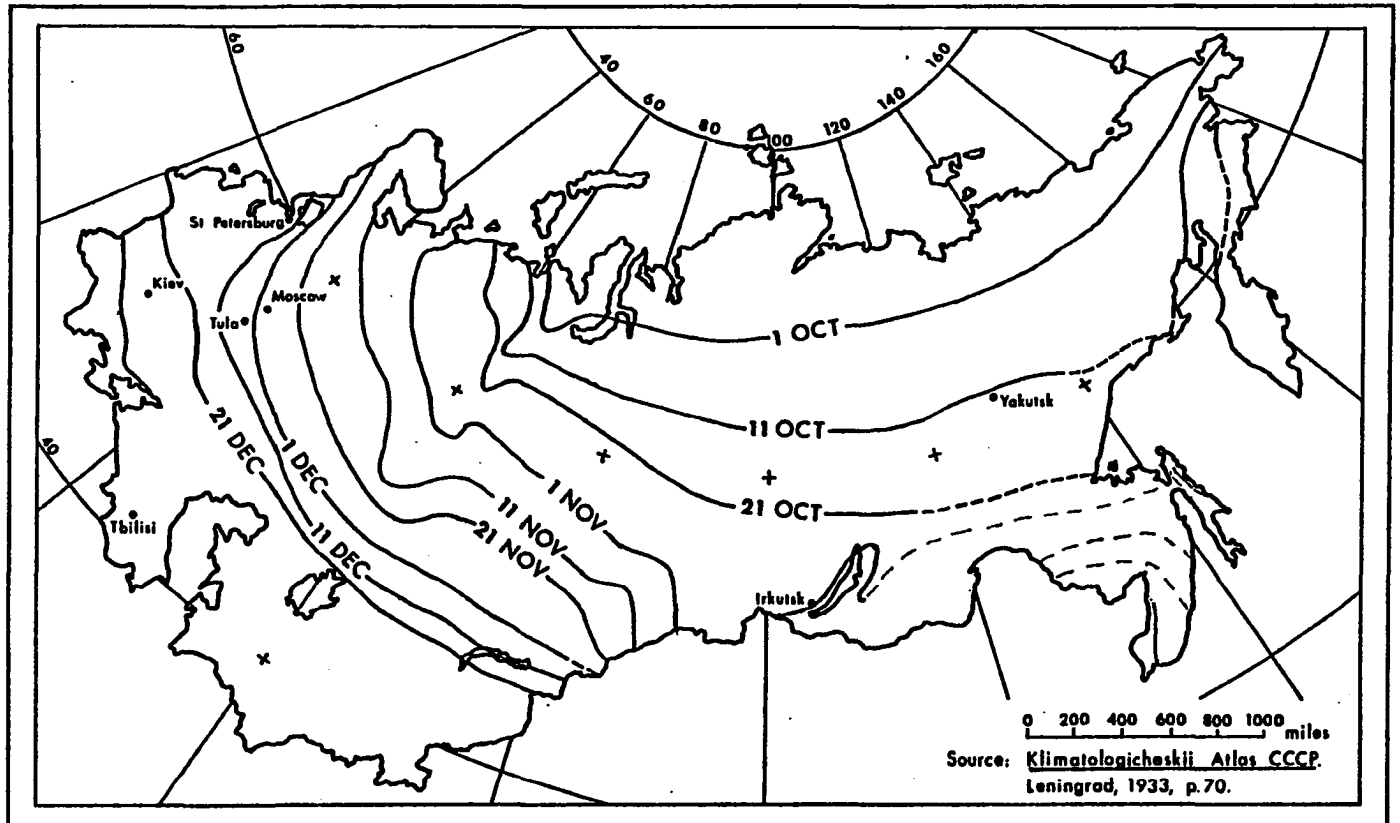
Fig. 4.1

The earliest full-time sledging occurred in early October in the extreme northeastern guberniia of Archangel and across the northern tier of Siberia eastward to the Bering Sea. Good, hard frozen roads were available by late November in two-thirds of Russia. Winter transportation opened in the other one-third, from Russian Poland, Kiev, Kharkov, Astrakhan, Central Asia, and southern Siberian provinces, by late December. (Figure 4.2)

Sanka and oboz locomotion were prolonged where the snow remained on the ground. In the northern one-third of the Empire, sledge-roads were busy from 180 to 260 days per year; the middle one-third, from 100 to 180 days; the southern one-third, from 20 to 100 days. The inhabitants in the St. Petersburg and Moscow guberniias averaged 140 days where snow-roads were available. The coastal settlements of the Black Sea and southern Central Asia averaged 20 snow days per year. In this part of the Empire, where the snow duration was short, winter cartage was insignificant. In this case, grain destined to the Black Sea ports from the interior started out in sledges but arrived on wheels.[6] The

---

[6]It was not common practice for peasants to own both sanka and telega. As a rule, the summer cart and wagon was also the winter conveyance. The all-year vehicle was simply converted by replacing wheels with runners, which were carried on trips during the seasonal transitions.



DATE OF BEGINNING OF PERMANENT SNOW COVER, 1891 - 1915

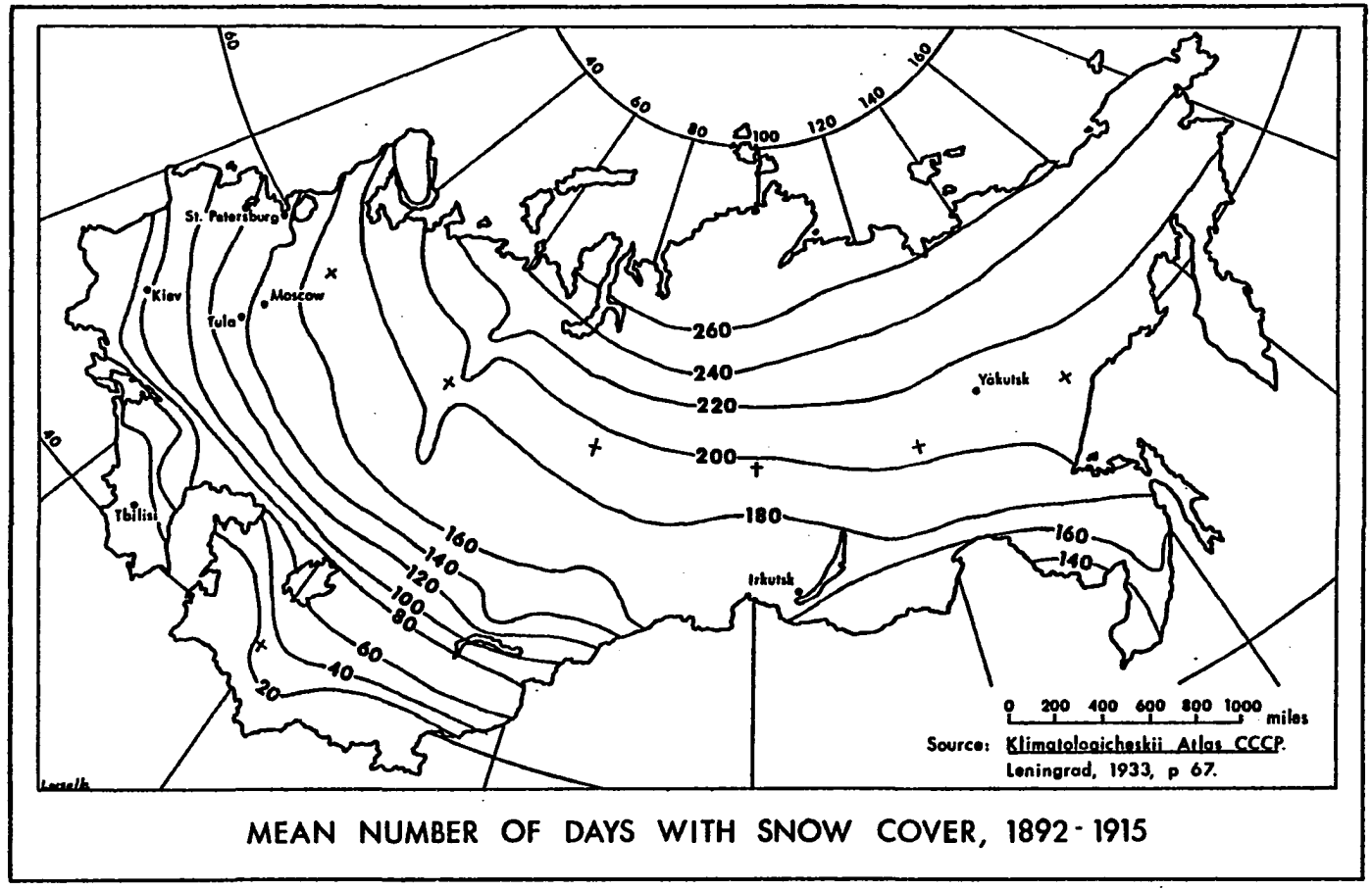
Fig. 4.2

populated districts in the TransBaikal region to the Pacific coast and Sakhalin Island averaged 160 days of snow cover. (Figure 4.3)

Ice-Highways. During navigatzia, that is, when the waterways were free of ice, wide and narrow bodies of water were always formidable barriers to carters and ordinary travelers since few fixed bridges were in place. When frozen, Russia's rivers and waterways became instant highways increasing the net mileage of usable roads. To make the point, more than 500,000 miles of waterways could be utilized as routes when frozen (SW, 1980, p. 2). Because many of Russia's ice-roads were hundreds of miles in length, local authorities constructed temporary winter shelters along the road banks for the travelers (Atkinson, 1858, p. 20).

After wooden and floating bridges were dismantled with the encroachment of winter, the ice-highways began to take shape. The large and important waterways were managed by the State Administration of Roads, an appendage of the Ministry of Ways of Communication (Knox, 1869, p. 299). Ice-roads not under the supervision of the state were relegated to the local police (Lagny, 1854, p. 95). The ice-roads used by the state postal bureau were laid out by the district post-masters (Hawes, 1904, p. 55).

All waterways in the Empire were frozen by late December



MEAN NUMBER OF DAYS WITH SNOW COVER, 1892 - 1915

Fig. 4.3

(Kropotkine, 1883, p. 75). As a general policy, foot traffic was permitted when ice was about three inches thick; five inches thick for one horse and sledge; nine inches thick for vehicles with several horses; eleven inches thick for any number of animals and vehicles (Lagny, 1854, p. 195). In St. Petersburg, the Neva River and its tributaries usually were frozen by late November with ice from 24 to 38 inches thick (Smith, 1810, p. 153). The Volga River ice-highway was generally frozen by late November providing about 153 days for sledge locomotion (Kropotkine, 1883, p. 858). Qualified personnel marked out the frozen roadways to avoid air holes, thin ice, and open water with "viekhi" (pine boughs)[7] inserted at regular intervals (Gautier, 1875, p. 102; Kennan, 1910, p. 457). The Neva River and its tributary ice-roads that served St. Petersburg and environs used straw frozen into the ice for the sledgeway (Kohl, 1844, p. 20). When ice-highways began to break up, the police posted warnings and broke the ice near the shore to prevent daring drivers from attempting the dangerous ice conditions (Castera, 1800, vol. 2, p. 264).

The duration of the ice-roads were not the same throughout the land nor were they the same year after year.

---

[7]The derivation of the word comes from vietka or twig (Erman, 1848, vol. 1, p. 401).

Depending upon their size, volume, and swiftness, the rivers froze at different times. River systems in the north, for example, North Dvina, Irtish, Yenessei, and Lena had extensive days when frozen. In these watershed, ice-highways were particularly important as sledge-roads. Rivers that flowed south were less inclined to have a long, frozen season. The Dniepr, lower Volga, and Don systems had reasonable durations when iced, but they were not as long as the other river watersheds.[8] (Table 4.1)

Winter Impediments. Although cold weather roads provided important economic and social advantages over warm season roads, frozen thoroughfares also provided unpleasant travel conditions. The most serious obstructions to winter land carriers were blizzards, lack of snow, and unpredictable thaws. The inhabitants and visitors were warned they risked health and life if not properly dressed or prepared. It was common for travelers to lose noses, ears, cheeks, toes, feet, and so forth. Careless drivers and their passengers were found frozen in their sleds (Fletcher, 1966, p. 8).

---

[8]The time when ice started to form until the time when frozen, takes several weeks and is dangerous for passage. Today, Soviet engineers have invented a method to cut down this useless period. By spraying the selected river crossing, an early ice-bridge is formed, allowing motor traffic to cross six weeks earlier (SW, 1981, p. 2).

TABLE 4.1

DURATION OF ICE-HIGHWAYS OF MAJOR BASINS FOR 1900-1909

RIVER BASIN	AVG. DAYS FROZEN	AVG. DAYS FROZEN FROM 1900-1909
Basin of N. Dvina	175-204	178-202
Basin of Neva and Lakes Ladoga, Onega, and Ilmen	145-192	144-198
Basin of W. Dvina.	47-200	112-165
Basin of River Nieman.	95-133	120-142
Basin of River Dniepr:		
(a) Lower Rapids.	100-105	79-127
(b) Upper Rapids.	72-164	106-160
Basin of River Volga:		
(a) Lower than Kama.	109-180	108-175
(b) Higher than Kama.	131-213	130-204
Basin of River Don.	109-178	105-163
Basin of River Ob:		
(a) Higher than Irtish.	193-211	190-211
(b) River Irtish.	0-200	189-205
Basin of Yenessei.	193-219	190-211
Basin of River Lena.	218-226	211-232
Basin of River Amur.	161-210	165-212

SOURCE: Compiled from Russian Year-Book, 1915, p. 283.

Several types of winter storms were distinguished by the natives. The myattyal, or light snowfall; the zamet, or blowing snow; the vinga, a heavy snowstorm accompanied by strong wind. The myattyal and zamet storms did not deter travelers, but drivers refused to work during a vinga. All winter-road communication ceased until this gale passed (Kohl, 1844, p. 469). The purga, the heaviest blizzard, lasted from one to twelve days. Carters, caught on the road during a purga, would lie headward on their sledges for days at a time. The buran, a Siberian winter rainstorm,[9] devastated frozen earth-roads and ice-highways causing slushy surfaces and dangerous riding (Czaplika, 1914, p. 6). Winter rains were usual occurrences along the Baltic coast, and they commonly eroded the winter highways. On the other hand, early snow and cold in the Baltic region enhanced land intercourse (Rigby, 1842, vol. 1, p. 107).[10]

A dangerous situation to horses and travelers alike were the unusual oukhabai (wavy-roads) (MacCollins, 1864, p. 27). This condition was caused by heavy traffic on the road.

---

[9]The term buran generally is associated with any large storm system. Hurricanes, burani, would be considered such a storm that periodically crossed the Baltic Sea inland into northwest Russia.

[10]Russians used the phrase "little winter" (emphasis added) when unexpected snow conditions arrived ahead of schedule.

The horses' hooves kicked up snow which formed a ridge when frozen. Over these roadways, the traditional troika gave way to single-file harnessed horses (Erman, 1848, vol. 2, p. 119). Many of these frozen ridges were ten-feet high where drifting was heavy. Such roadways were a perpetual succession of ridges and valleys, drivers and passengers alike had to endure constant jolting and vehicle upsets (Morley, 1866, p. 16).[11] There were also ruts that made the winter-roads treacherous and the driving slow. The worst driving imaginable occurred when the roads were anywhere from three to five feet deep, a common phenomenon on well-traveled, unpaved frozen highways (Turner, 1905, p. 125).[12]

There was a certain enthusiasm when "little winter" (emphasis added) arrived earlier than expected, but late winter conditions caused merchants to lose substantial economic gains. Lack of snow would completely stop commerce, thereby causing the inhabitants to suffer and the economy

---

[11]Undulating snow-ways were called "grufte" among German inhabitants (Kohl, 1844, vol. 2, p. 356).

[12]Today traveling over icy roadways is not as welcomed as it was in Old Russia. In 1981, the Soviet Union opened an experimental heated highway in Moscow. The foundation is lain with warm water pipes and covered with asphalt. Soviet authorities believe such heated roads will be cheaper to clean than plowing. Moscow, for example, maintains a fleet of 100,000 snowplows and dump trucks just for snow removal (SW, 1981, p. 4).

to stagnate. When daily materials and foodstuffs could not be carried to cities and towns, it was necessary to enforce rationing (Tooke, 1801, vol. 1, p. 19). Such was the case during the winter of 1886-87 when only meager amounts of snow fell in northwestern Russia (CR, 1889, p. 281). A mild winter also took considerable toll on the vehicles. The roadsides were commonly scattered with broken sledges that tried to make journeys over sloppy roads (Kohl, 1844, vol. 2, p. 364).

The phenomenon of early thaws was referred to as ottepely (Jorre, 1967, p. 27). These unexpected thaws frequently forced carters to move very slowly or to abandon the journey altogether. Additional days on the road were required when dirt thoroughfares began to break up (Murray, 1849, p. 584). It was maddening to traverse roads that were spongy or iced over in places, or in other sections, mud and water. An ottepel that lasted seven to ten days was serious enough to impose severe hardships on the urban communities due to the delay of provisions. Prices of certain commodities soared and any scarcity encouraged black market situations (Murray, 1849, p. 568). The overall economic posture of the national economy was jolted by impaired winter ottepely. For example, many thousands of rubles were lost in 1913 when about twenty percent of Russia's cut timber was left to rot as a result

of an early thaw that rendered the logging roads useless (CR, 1913, p. 108).[13]

Due to the unpredictable aspects of winter travel, Russian law in the mid-eighteenth century protected all contracts between buyer and seller. When frozen roads became quagmires and goods were ruined or left behind on the highway, all agreements were declared null and void (Hanway, 1753, p. 88). The only time traders were not released from a binding contract was in cases of highway robbery, pillage, or fire to merchandise (DBR, 1852, p. 22). Unforeseen thaws, and other winter deterrents, reminded foreign businessmen that to conduct commerce in the Russian Empire, one had to be "sympathetic" (Beable, 1918, p. 94).[14]

Dimensions of Warm Weather

The most serious drawback to ground transportation occurred when the earth-roads became liquefied and the partially paved highways lost some of their construction. This condition caused all carts and wagons to remain inactive because the animals could not pull loaded vehicles any considerable

---

[13]The peasants prepared for unpredictable road intercourse by storing provisions in cellars to carry them through the winter.

[14]The rough conditions of traveling always presented danger to merchandise. This brought about the important cottage industry of making the packing cases for land carriage. The containers were wooden and uniquely built to withstand jolting and weather (Drage, 1904, p. 185).

distance through indistinguishable roads, deep mud, or water surfaces.

The Russians coined a term to designate the season of the mud when all ground transportation halted--rasputitsa (Erman, 1848, vol. 1, pp. 318-19).[15] This period had considerable impact upon the development of Russian society. When road intercourse between towns and villages was prohibitive, it was time for other activities. The peasants called this time of year srok (idleness). It was synonymous with the rasputitsa (Trevor-Battye, 1898, p. 132).

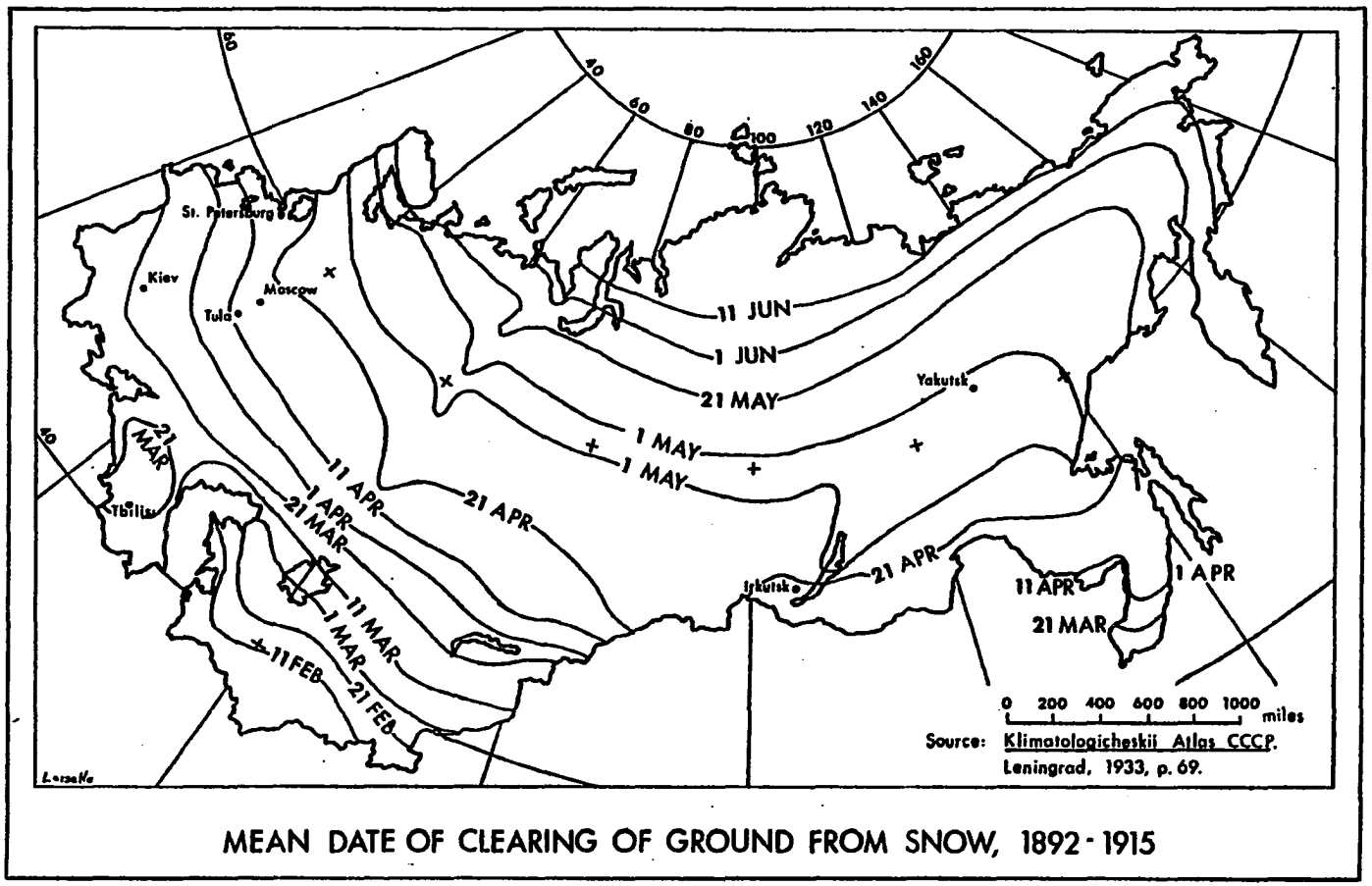
The cyclical degeneration of frozen roads was so pervasive in its effect that it was regarded as Russia's fifth season. In other words, there was winter, spring, summer, autumn, and rasputitsa (Trevor-Battye, 1898, pp. 120-21). What made the period of bad roads even worse was its biannual occurrence. There was spring- and autumn-rasputitsa (CR, 1891, p. 193). During these periods, horses died by the hundreds trying to work the roadways of mud (Weber, 1723, vol. 1, p. 329).

---

[15] Rasputitsa has acquired a variety of interpretations over the years. To some it was the "time of the unroading," or "spoilage of the roads" (BEM, 1848, p. 82). Others called it "traffic stoppage" or "parting of the ways" (Jorre, 1950, p. 25; Trevor-Battye, 1898, p. viii). Whatever the terminology, rasputitsa meant that the roads and highways were out of commission until dried or repaved to support wheeled vehicles.

Spring-Rasputitsa. The spoiling of the roads and highways during the spring was due to the thawing and melting of snow. The sun converted the frozen ground into a sea of mud and slime. Conveyances could not take to the roadways until the earth-roads dried. In order to prolong road use in some areas of Russia, peasants along the important trade arteries slowed the process of melting by chopping slabs to expose the bare ground. Since the soil below was still solidly frozen, sled or wheel transportation was possible before the sun changed the surface into a morass of mud (Porter, 1809, p. 166).

The devastation of roads began in the south and proceeded northward with the migration of the sun's rays. The far southern section of the Empire experienced spring thaw about the middle of March. The black-earth provinces were generally one of the worst regions during this time. The soil here was saturated with water and had the consistency of glue or tar. In these territories, the roads began to break up in early April. The surrounding public highways, post-roads, and field-roads in St. Petersburg, Moscow, Orenburg, and other eastern guberniias started to have their overland routes destroyed by mid-April. South of the city of Archangel, far north to Irkutsk in central Siberia, to the region where the Amur River flows into the Pacific Ocean, spring-rasputitsa arrived about the first week in May. Sledge-roads in far north-central Siberia were in operation well into June. (Figure 4.4)



MEAN DATE OF CLEARING OF GROUND FROM SNOW, 1892 - 1915

Fig. 4.4

Autumn-Rasputitsa. Impassable roads during the fall were due to the annual rains. From the perspective of practicality, getting about was always before and after the rainy period but never during rasputitsa (Giers, 1962, p. 115). The peak of fall roadlessness was in October. The government in St. Petersburg regarded the month of October as more devastating to travel than spring-rasputitsa. In fact, all post-roads in northern Russia were closed for thirty days in October (Trevor-Battye, 1898, p. 132).

Figures for a 20-year period, from 1891 to 1915, for October, showed that fall-rasputitsa was severest in the districts southwest and northeast of Moscow, one of the heaviest populated regions in the Empire. But the vast majority of European Russia (including Poland) received 40-50 mm of precipitation in October.[16] The unroading here was not any less significant than that in the small belt surrounding Moscow. The wettest area in the Russian state was located on the eastern littoral of the Black Sea and inland into the Caucasus Mountains, where the average precipitation was from 50 to 200 mm in October. Rasputitsa was not as agonizing to the inhabitants and economy here because roads in rugged terrain were quickly drained of any significant rainfall, a fact that

---

[16]One millimeter is equivalent to .03937 inches or 0.001 meter.

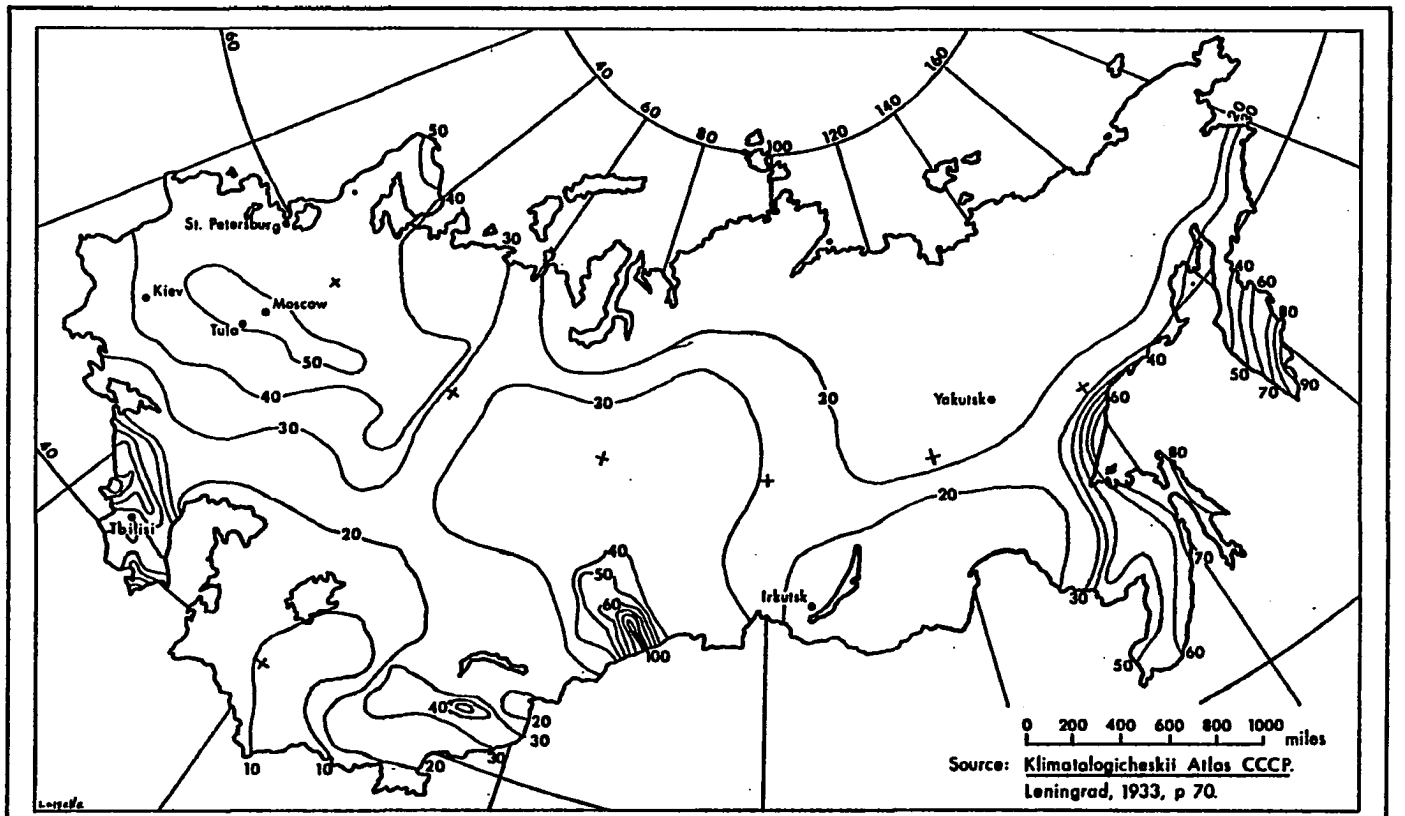
cannot be claimed in European Russia where the topography was primarily a plain. The roads and tracks in Central Asia and southern Siberia were in somewhat better condition because precipitation in October was not as great. Siberia proper, on the other hand, had serious land transportation problems in the fall, especially in the Far East districts that touched upon the Pacific Ocean. (Figure 4.5)

Because atmospheric conditions determined the length and geographical extent of rasputitsa, the season of roadlessness was not uniform over the Empire. In north and northwest Russia, the roads were out of use from six to seven months; in the central provinces, from four to five months; in the southern governments, from two to three months (Rubinow, 1908, p. 56). Among the inhabitants it was generally accepted that all dirt carriage and cart ways would be useless about six weeks in the spring and six weeks in the autumn (Custine, 1839, p. 354).[17]

Terrain. A facet of spring- and autumn-rasputitsa, often overlooked but no less significant, was the geographical

---

[17]The problem of rasputitsa in a modern setting can be appreciated by the fact that Soviet statistics in the late 1960s showed that on an average day about 60,000 motor vehicles in agricultural districts were idle because roads were muddy (QER, 1968, p. 5).



MEAN MONTHLY OCTOBER PRECIPITATION, 1891-1915

(millimeters)

Fig. 4.5

correspondence between precipitation and topography. The majority of European Russia and western Siberia comprised an immense plain. Physiographic flatness retarded water drainage and in many areas absorption was slow, as was evaporation because of cool temperatures. If spring and autumn were excessively cloudy or cool, then the rasputitsa was extended. The immensity of this phenomenon was realized on the Great Russian Plain, where population densities were the highest than other areas in the Russian Empire.

Although the flatness of the land contributed to the lengthy periods when land transportation ceased, the absence of rugged terrain was helpful in that drivers did not have to contend with topographical difficulties. Where paving of important highways occurred, the level ground aided in the construction and maintenance. In the outlying districts, the mountain regions of the Caucasus, Central Asia, and the Far East, road accessibility was a major problem to begin with and rasputitsa only compounded the travel problems.

Rasputitsa and Isolation. Russia's social and economic well-being was tested when rasputitsa caused road transportation to stop. The biannual roadlessness cut service between the countryside and the urban places. Because of this situation, aspects of social, political, and economic life were largely self-sufficient. Cities and villges, large and small,

were islands surrounded by seas of mud. Until rasputitsa abated, the municipalities survived on their internal resources.

Srok, the period of idleness brought about by roadless conditions, disrupted the continuity of normal day-to-day activities. Even in the best of times, daily existence was not easy, but when the thin connections between communities were broken, the economic interactions, on which modernization were based, ceased. Fields could not be tended, industrial materials were lost, prices of commodities increased, food scarcities developed, psychological stresses arose, and so forth. The potential result can be measured by the fact that in 1829 there were 1,840 cities and towns and 227,400 villages and hamlets (NWR, 1830, p. 240).

Isolation of the urban centers was in many respects more serious than in the rural regions, considering the complicated interaction among urban communities and their reliance upon the countryside for foodstuffs. The isolation of cities and towns can be evaluated by the proportion of towns to the area of each province in 1851. Mud conditions that halted road communication were severest in the Don province where there was only one town for every 2,943 square miles. In the Archangel guberniia, there was one town for every 1,500 square miles. In the province of Astrakhan, there was one town for every 715 square miles. The least isolated were in the

guberniias of Poland where there were a total of 85 towns, or one town for every 27 square miles. In European Russia, Grodno province had one town for every 28 square miles; Moscow, one town for every 39 square miles; Kaluga, one town for every 41 square miles. For European Russia as a whole the average was one town for every 121 square miles. (Table 4.2)

Seasonal Employment

Winter and summer were the important periods when millions of the peasants had opportunities to earn extra income as temporary voschiki (carters) or izvoshchiki (cab drivers). In the last half of the nineteenth century, the Russian economist, Paul E. Sychin, figured that six million peasants left their izbas (huts) every year to find temporary employment (Troyat, 1961, p. 207).[18] Many of them entered the land carriage occupations. For example, as many as 800,000 peasants found work as carters and carriers every summer, a figure that swelled to three million in the winter (Soloveva, 1975, p. 26).[19]

---

[18]The peasants preferred winter to cart their own goods. About 20 percent of the peasant's personal time was expended on winter cartage, whereas only 8 percent in summer (Lyaschenko, 1949, p. 314). This was in addition to the system of podvodnaya povinost, that is, forced drayage of landlords' goods (Gerschenkron, 1968, p. 162). About 40 days per year were set aside for obligatory carting (CR, 1851-52, p. 325).

[19]As many as 600,000 peasants found temporary employment working in the river transport system in the summer (MacPherson, 1910, p. 34).

TABLE 4.2

THE EFFECT OF RASPUTITSA COMPARED TO THE GEOGRAPHICAL AREA OF FIFTY EUROPEAN PROVINCES, 1851

PROVINCES	ONE TOWN TO SQ. MI.	AREA IN SQ.MI.	NUMBER OF TOWNS	URBAN POP.
1. Don	2,943	2,943	1	20,000
2. Archangel	1,500	12,000	8	27,200
3. Astrakhan	715	2,860	4	51,700
4. Vologda	536	6,967	13	40,700
5. Orenburg	398	6,773	17	58,300
6. Olonets	398	2,784	7	16,900
7. Stavropol	373	2,650	7	43,200
8. Perm	370	6,073	16	62,100
9. Saratov	252	3,525	14	182,000
10.				
11. Novgorod	201	2,213	11	32,500
12. Viatka	192	2,500	13	43,900
13. Minsk	147.5	1,622	11	69,300
14. Kherson	111	1,332	12	217,700
15. Volhynia	108	1,295	12	105,200
16. Simbirsk	101	1,315	13	105,800
17. Tambov	100	1,202	12	111,100
18. Tver	94	1,223	13	86,400
19. Ekaterinoslav	93	1,206	13	87,400
20. Voronezh	93	1,209	14	83,450
21. Kazan	87	1,128	13	78,900
22. Vilna	85.66	768	9	75,500
23. Smolensk	85	1,019	12	54,500
24. Tauride	77.5	1,163	15	114,200
25. Kovno	76	758	10	47,700
26. Kostroma	75	1,496	20	41,200
27. Kiev	76.66	914	12	166,800
28. Estland	75	376	5	28,400
29. St. Petersburg	75	970	13	592,200
30. Mogihlev	74	885	12	51,900
31. Pskov	73.5	809	11	42,200
32. Bessarabia	71.5	858	12	146,600
33. Orel	71.5	859	13	129,600

TABLE 4.2 (continued)

PROVINCES	ONE TOWN TO SQ. MI	AREA IN SQ. MI.	NUMBER OF TOWNS	URBAN POP.
34. Lifland	71	853	12	95,800
35. Nizhni-Novgorod	67.5	877	13	74,300
36. Vitebsk	67.5	810	12	74,100
37. Riazan	64	766	12	77,300
38. Kharkov	61.5	985	16	135,400
39. Yaroslavl	60	660	11	79,200
40. Vladimir	57.5	862	15	70,400
41. Podolia	55	774	14	85,400
42. Poltavia	53	897	17	107,000
43. Chernigov	53	1,000	19	100,300
44. Penza	53	690	13	76,000
45. Tula	46	555	12	91,200
46. Kursk	45.5	818	18	115,800
47. Kurland	45	496	11	64,200
48. Kaluga	41	573	14	93,800
49. Moscow	39	589	15	393,500
50. Grodno	27.75	693	25	83,300
51. Poland	27	2,294	85	480,000
TOTAL	121	88,887	702	5,331,650

SOURCE: Figures taken from Haxthausen, 1855, Vol. 1, pp. 96-97.

Nomadic part-time carriers with their own equipage moved from city to city based upon the price of hay for their horses (TQR, 1841, p. 414). If the price of feed was high then they would move on to another city and so forth (Murray, 1849, p. 506). The vast majority of traveling teamsters and cab drivers only wanted to earn enough money to pay their taxes or to keep and feed their horses during the long winter hiatus (TBCL, 1893-1894, p. 26; Kropotkine, 1878, p. 83).

It was traditional for inhabitants of entire villages or districts to set out with horse and wagon or by foot to seek work in land carriage. This was the practice, for example, in the province of Viatka in northern Russia, where every year in one district, from 500 to 600 villagers began their journey in late November and returned at the end of March in time for planting. Migratory winter carriers in this particular area went to either Moscow or the large winter fair at Irbit (TBCL, 1893-1894, p. 26).[20]

Land carriage as supplementary employment was also important to villagers located near industrial regions where peasants did not have to leave home for extended periods. In the

---

[20]The migration from the countryside to cities caused the population to fluctuate seasonally. Moscow's population, for example, in 1812, was 200,000 but increased in the winter to 300,000 (NWR, 1812-1813, p. 255).

iron manufacturing area of the Moscow province during the 1830s, agricultural families from the hamlet Zago earned 43 percent of their total income from part-time winter carting (Crisp, 1978, p. 339). Many roving peasants who could not find work in drayage went into ground-related transportation jobs. For example, cartless peasants from the provinces of Orel, Baku, and Saratov went north to Moscow every summer and worked as street pavers, road repairers, or maintenance personnel (Troyat, 1961, p. 207).

Conclusions

The harsh physical environment and overland travel conditions were interrelated. The cultural development of Tsardom was directly incluenced by day-to-day weather conditions that determined the efficiency of land transportation. Effects on paved and unpaved roadways by frost, snow, thaws, rains, mud, dust, and aridity played important roles in sledge and cart locomotion and traction.

The season when transportation was most dependable and efficient was winter. From a commercial viewpoint, winter highway transportation was relatively swift, cheap, and efficient. Moreover, the road network increased substantially when thousands of miles of navigable waterways froze and became free highways. In consequence, distance and time were shortened allowing unimpeded progress. On the other hand,

during summer the rivers were major barriers as bridges were rare. Because of the independent-mindedness, hard-knocks schooling, and driving ability that characterized part-time and permanent carters, winter locomotion serviced the cities and the villages of the Empire.

It was the warm months that created poor road travel. The most serious stoppage by weather was rasputitsa, an event that occurred every year in the spring and again in the fall. Twice a year the great country became hostage to the climate, and all means of road accessibility were threatened. The result was bezdorozhnaya (roadlessness). The Russian Empire had an intricate network of roads and highways but unfortunately the majority of them were unpaved. The consequences of rasputitsa were numerous. The effects of roadlessness were due to rasputitsa and not because of the absence of roads and highways.[21] Roadlessness, due to the weather and the lack of weatherized roadways, had a strangle hold on Russian programs to modernize. Everywhere the nation suffered short- and long-range social, political, and economic repercussions as the isolation lasted for weeks.

Despite the effects of rasputitsa, the seasons were influential in providing millions of marginal peasant families with temporary jobs as land carriers. Carting as a sideline

---

[21]The subject of Russia's road and highway network is discussed at length in later chapters.

occupation was an annual occurrence in the Russian economic system. Water and rail facilities were unable to provide continuous uninterrupted transportation, therefore carriage service became a catchall for the Empire's land transport requirements.

CHAPTER V

THE RUSSIAN POST-ROAD SYSTEM AND METHOD OF POSTING

Introduction

Coordinated ground transportation originated with the establishment of the Russian Imperial Post. As mail routes reached into outlying settlements, the post-roads became the core component of Russia's road and highway transportation system. The earlier post-routes were designed and built for political unification. Only in later years of Tsardom did the government permit civilians to travel over post-roads.

Succeeding rulers opened mail-roads as situations warranted. In the beginning, all post-roads were simple affairs and were a combination of dirt and log surfaces. During the macadam period, entire stretches of major thoroughfares were stoned, but the vast network of the Imperial Post land routes were primarily unweatherized at the end of the Empire in 1917.

In an economic move to reduce overhead, the inhabitants and visitors were allowed to travel over post-roads for a fee, but to travel over government roads, a variety of laws and technical rules were required to be followed. Posting in the

Tsarist state was interesting despite the rigid travel procedures.

This chapter discusses the development, operation, and method of riding over the Russian post-roads. Also particular attention is given to several roads that were important to the government and citizens.

Early Post-Road Development

Despite the criticism directed toward ground travel in Tsarist days, the Russian Empire was thought to be one of the best in Europe in the late nineteenth century (Bookwalter, 1899, p. 13).[1] The earlier building of post-roads was anything but modern and efficient. The roads, built to carry important letters pertaining to the affairs of state, were known to exist in the Middle Ages, but post-road travel was crude and did not become relevant to the state until the middle of the seventeenth century (Utechin, 1964, p. 433). The origin of the russian system of post-roads was for military reasons, than for carrying mail and documents, and finally for use by the general public (Collins, 1858, p. 222).

In 1644, Tsar Alexis I (1645-76) ordered that all district administrations and the capital, Moscow, be serviced by

---

[1] A Russian critic of the Tsarist postal organization believed that post-road travel was the best in France, Switzerland, and England respectively in the mid-nineteenth century (Herzen, 1968, p. 644).

mail couriers (IC, 1892, p. 832).[2] Peter the Great (1682-1725), like his father Alexis, believed in post-roads as an instrument of governing. Peter ordered that mail-routes be laid in all major districts (TEB, 1823, p. 381). By 1697, five postal routes were established south of Moscow: (1) the Moscow-Kaluga-Sevsk-Kiev Post-Road; (2) the Moscow-Kaluga-Sevsk-Arhturkha-Poltava-Zaporshe Post-Road; (3) the Moscow-Tula-Mtsensk-Kursk-Belgorod Post-Road; (4) the Moscow-Tula-Novyioskol-Azov Post-Road; and (5) the Moscow-Kolomna-Tambov Post-Road (Fuhrmann, 1972, p. 215).[3]

Since efficiency and organization were important criteria and Russian unfamiliar with the post concept, Peter ordered post-road transportation to be structured after the proven German system (Weber, 1723, vol. 1, p. 115). The Empress

---

[2]The first Postmaster-General was Andrew Vinius, a Russian national whose father was Durch and mother Russian (Browning, 1898, p. 53). The first international postal service was inaugurated in 1667 between Russia and Poland (Schuyler, 1884, vol. 1, p. 206). Stamped envelopes were first used in Russia in 1845-48. These bore the double-headed eagle enclosed in a circle with appropriate language. The first adhesive Russian stamp was issued from 1857-64. In the mid-1850s, Russian stamps cost from five to thirty kopecks (Harper's, 1871, p. 743).

[3]Before Tsar Peter I opened new land routes into the southern dominions, a bold proposal came from the French government. King Louis XIV suggested to Peter that French merchants would finance the construction of post-roads, verst-posts, and post-stations in exchange for use of southern Russia as a corridor to markets in Persia, India, and China. The Tsar studied the offer but ignored it (Tolstoi, 1932, p. 131).

Elizabeth (1741-1761) renewed interest in establishing supervision between the head of state and district officials. In 1752, she commanded the Senate to fund resources to construct new post-roads in the *gubernii*as of St. Petersburg, Kiev, Astrakhan, and Siberia (Lauber, 1967, p. 61). The monarchs that followed improved land post communication as conditions demanded. By the mid-1800s, a traveler could ride from St. Petersburg eastward 5,000 miles to the Kamchatka Peninsula in far northeastern Siberia by the Russian Post (Kennan, 1910, p. 444).

Modern Post-Road Development

The post-road system of travel in Tsardom after the 1800s was more efficient and regular than in previous times. The cross-country network of roads in 1882 required 4,355 post-stages and employed 15,560 workers including a stable of 446,460 horses (Kropotkine, 1885, p. 87). At the end of the 1880s, approximately 112,000 miles of post-roads traversed the Empire. It was possible for anyone to travel to any major city or important outlying settlement by mail-cart. When the Russian state was dismantled in 1917, post-roads accounted for only 64,670 *versts* (about 42,876 miles) including 4,271 post-stages and only 27,782 government post-horses. The calamitous decline was due to the importance that the Russian state placed on the railways (Zaborsky and Gudanov, 1918, p. 264).

Regarding paved post-roads, the Empire had very few. The network of mail-roads was too extensive to be entirely weatherized, but important stretches near large metropolitan areas were covered with stone. The government compiled a list of provinces where 500 versts (about 331 miles) or more of macadam post-routes were available in 1912. Out of 89 guberniias, there were only 29 provinces that exceeded 500 versts of hard-surfaced roads. Paved roads were the most numerous in the Moscow guberniia, followed by St. Petersburg, Tiflis, Warsaw, Grodno, Ekaterinoslav, and Vilna. The provinces of Podolia, Tver, and Pskov were at the bottom. Table 5.1 shows specific information about the roadways macadamized under the authority of the Ministry of Interior.

Post-Road Organization. The Russian Post was not regulated by the Ministry of Ways of Communications, the branch of government supposedly responsible for public roads and highways. The management, funding, and construction was instead the jurisdiction of the Ministry of Interior, Department of Post and Telegraphs in the nineteenth century (RJS, 1901, p. 312).

This department recognized four categories of post-roads in the 1850s: (1) the Glavnaia Pochtovoia-Doroga, or Main Post-Roads; (2) the Gubernskaia Pochtovoia-Doroga, or

TABLE 5.1

PROVINCES WITH 500 VERSTS (ABOUT 331 MILES) OR MORE OF STONED OR PARTLY STONED ROADS UNDER AUTHORITY OF MINISTRY OF INTERIOR, 1912

PROVINCE	PAVED		PER 10,000 SQUARE VERSTS	PER 4,400 SQUARE MILES	PER 1,000,000 INHABITANTS	
	Versts	Miles			Versts	Miles
1. Moscow	2,118	1,404	725	319	658.7	436
2. St. Petersburg	1,774	1,176	452	199	615.2	408
3. Tiflis	1,542	1,022	376	165	1,178.8	781
4. Warsaw	1,514	1,004	986	434	610.0	404
5. Grodno	1,505	998	440	194	764.4	507
6. Ekaterinoslav	1,360	902	244	107	444.3	295
7. Vilna	1,144	758	184	81	301.2	200
8. Piotrkow	987	654	917	403	510.5	338
9. Taurida	949	629	179	78	505.6	335
10. Siedlce	890	590	708	312	906.9	601
11. Mogilev	849	563	201	88	383.1	261
12. Suwalki	790	524	730	321	1,183.1	784
13. Kalisz	789	523	792	348	700.2	464
14. Lomza	780	517	841	370	1,140.2	756
15. Vladimir	734	487	171	75	387.1	257
16. Radom	672	445	619	272	621.6	412
17. Tula	650	431	239	105	366.5	243
18. Lublin	648	430	438	193	429.4	285
19. Chernomorsk	602	399	872	384	5,063.4	3,356
20. Kars	585	388	355	156	1,578.5	1,046
21. Erivan	643	426	237	104	604.8	401
22. Orel	577	382	141	62	223.5	148
23. Chernigov	561	372	122	54	188.6	125
24. Kielce	561	372	633	279	581.6	386
25. Plotsk	557	369	667	293	795.9	528
26. Novgorod	551	365	53	23	336.2	223
27. Podolia	510	338	138	60	135.9	90
28. Tver	508	337	89	39	233.5	155
29. Pskov	507	336	134	59	374.0	248
TOTAL	25,857	17,141	12,683	5,577	21,822.4	14,466

SOURCE: Statisticheskii Ezhegodnik Rossii 1913 g. (god desyati) izdanie: tsentralnago statischeskago komiteta M.V.D. Tablitsa 10, p. 46. St. Petersburg, 1914.

Provincial Post-Roads; (3) the Uyezdnaia Pochtovoia-Doroga, or District Post-Roads; and (4) the Prooshaia Bolshoi-Doroga, or Practical Large Road (Spottiswoode, 1857, p. 68).[4]

Russian law stipulated that all passenger carrying post-carts not exceed eight versts (about five miles) per hour in the fall, ten versts (about seven miles) per hour in the summer, and twelve versts (about nine miles) per hour in the winter. The reason for the different driving speeds was that post-lane surfaces altered from season to season depending upon the weather (HMM, 1857, p. 757). In the 1800s, postal runs in Siberia were undertaken only during the summer months and then only three times per year (Fuhrmann, 1972, p. 216).

System of Posting. At first travel over Russian post-roads was exclusively by state personnel and was paid with government funds. In order to reduce the tremendous outlay of subsidies to a variety of traveling officials, the burden was shifted to the inhabitants. In the 1700s, all peasants paid eleven kopecks for horses to convey government administrators and another five kopecks toward the supply of post-

---

[4]A major frustration to travelers was that no official map or list showed the extent of Russia's post-roads in the first quarter of the nineteenth century. The Central Post Office in St. Petersburg and Moscow provided to travelers upon request road routes and mileage of the journey for a fee of ten or twelve rubles (about $5.00 to $7.00) (Bremmer, 1839, vol. 1, p. 177).

horses at post-stages to carry the mail (Weber, 1723, vol. 1, p. 61). The drivers and stage workers at this time were paid a small salary that also came from taxation (Kluchevsky, 1960, vol. 3, p. 227).

The concept of yami (stages) was the result of Peter the Great's interest in opening military-roads. Since infantry columns at that time marched about 700 paces to the verst, they were rested every twenty versts (about thirteen miles). In order to give passengers and horses an opportunity to rest and feed, post-stages were constructed (Voltaire, 1749, pp. 199-200). But the vast majority of stages were at intervals of 15-25 miles (Johnston, 1816, p. 334).

Most post-stops were attached to villages of 500 to 600 peasants. From the post-villages, all duties associated with the road and mail were assured (Holman, 1834, vol. 1, p. 204). The stages were managed by the smotritel (superintendent), a state worker. Because of harsh living conditions in Siberia, post employees received one pay grade higher than other postal workers during the later 1850s (LLA, 1851, p. 252).

The post-stages maintained a corral of sixty to seventy government-owned horses (Erman, 1848, vol. 1, p. 21). To identify state-owned horses, the animals were marked with a dark stripe down their backs and ear scars (Simpson, 1898, p. 72). Horses leased from peasants that died doing postal duties were paid twenty-five rubles (about $13.00) (Collins, 1858, p. 222).

The method of posting was done in the Russian style. The horses were harnessed abreast. In non-Russian territory, animals were harnessed tandem or "gusem." That is, one horse ahead of the other (Erman, 1848, vol. 2, p. 522). The typical passenger carriage was the telega, a small seatless two-wheeled mail-cart capable of two riders inside and a driver outside (Haxthausen, 1856, vol. 1, p. 8).[5]

After the complicated harnessing procedure, an aspect unique to Russian horsemanship, it was necessary to enter a post-road at some post-gate, or zastava. Post-gates were generally at key points on the outskirts of town or at strategic junctions near public highways (Lyall, 1825, vol. 1, p. 32). The post-bar, a wooden pole across the roadway, was raised or lowered to permit admittance and painted in alternating colors. At every zastava were soldiers or police to inspect documents (Maxwell, 1850, p. 181).

To guide drivers in the 1700s, tall wooden verst-posts painted in red were erected on both sides of the roadway at every verst. Inscribed at the top was the year erected in Russian and German letters (Weber, 1723, vol. 2, p. 408). Later when the post-road system of travel took on Russian characteristics, the verst-markers were identified with an

---

[5]The telega was the common cart of the countryside and was used to perform a variety of carriage duties, the mail being just one function.

eagle at the top and the distance inscribed to the next post-station (Tolstoy, 1959, p. 711). Also, the poles were painted in broad vertical stripes of black, red, and white (Elliot, 1838, vol. 1, p. 238).[6] Travelers entering the Russian Empire from the western frontier saw high, striped wooden poles in two colors with the double-headed eagle, the official seal of the Russian monarchs, painted on a sideboard (Whitman, 1890, p. 605). The idea of informing travelers and drivers with verst-markers was Peter the Great's (Tyrell, 1858, p. 146).[7]

The general rules for posting were hung in every post-stop. Special regulations were also enforced at some stops. The line between Crakow, Poland to Vienna, Austria, before reaching the border, listed in 1822 the following directives:

---

[6]The verst-posts colors during the rule of Paul I (1796-1801) had no real significance. The Tsar was noted for eccentricities and this was only one (Knox, 1870, p. 407). Paul decreed, for example, that all vehicles adopt the German style of harnessing. Another capricious law required that all coachmen dress similar to their German counterparts (Kelly, 1850, pp. 162-63). To top it off, all sledges were not allowed to be painted blue. These restrictions were abandoned when Paul I was murdered (Mollory, 1905, vol. 2, p. 566).

[7]The verst-posts were also important in fixing latitude and longitude because maps in early Russia were rare and inaccurate. The first thorough and complete atlas was published in 1754 (Auteroche, 1770, p. 118). Ivan Kirolov, Secretary of the Senate, directed the compilation of the first atlas. In 1721, thirty cartographers were employed in this assignment (Waliszewski, 1897, p. 435).

1. The fare to be paid on taking the place, the money for which is never required.
2. Each traveler is allowed fifty pounds weight of luggage.
3. The trunks of baggage must be delivered at the coach-office before half-after six on the preceding evening, and the passengers must be ready at six in the morning.
4. Each trunk, bag, or parcel, must be directed.
5. No drink-money is to be given to the postillion.
6. Large dogs are not allowed in the coach.
7. The journey is to be performed in sixteen hours and the guard to stop nowhere but to change horses, with the exception, however, of one hour for dinner.
8. It is not permitted to smoke in the coach, if any of the passengers object to it.
9. The passengers, if desired, are occasionally to change places with each other.
10. A reciprocity of civility is to be observed between the guard and the passengers.
11. On arriving at Vienna, the passengers can have a custom-house porter to getch or take their luggage; but in this case the time and direction must be specified (Holman, 1834, vol. 2, pp. 260-61).

Other requirements regarding post-road travel entailed all private carriages to move off the post-road when post-bells were heard in the distance (Kennan, 1910, p. 471). The idea of post-bells on all post-carts was to warn the conveyances ahead that an official vehicle was in the vicinity and to make room for passage. The post-bells were also used to ward off animals (Rigby, 1842, vol. 1, p. 165). It was also illegal for public or private vehicles to overtake the coach bearing the royal family (Golovine, 1846, vol. 1, p. 79).

There was no imposition as to the time when post-roads could be traversed. They were open day and night (Spottiswoode, 1857, p. 33). To reduce grass fires in dry regions during the summer,

local authorities posted warning signs at all road stops that smoking while traveling over post-routes was against the law (LLA, 1896, p. 137). To ensure some semblance of public safety from highway robbers, the Senate in 1711 passed a law establishing military patrols to protect the road travelers and the mail on the major post-roads (Florinsky, 1970, p. 400).[8]

Posting was achieved by several methods. Passengers traveled na perekladnikh,[9] that is, horses and post-cart were rented from the Department of Post and changed at every post-stage (NS, 1918, p. 320). At every stop, pertinent information had to be recorded in the official register. In the 1890s, the Post-Master's Book included the following: traveler's name, place just arrived from, next stage-stop, hour of arrival, yemschick's name, and number of horses (Simpson, 1898, p. 65). Such travel, of course, was slow.

---

[8]Whether on the post-roads or public highways, one of the great fears that travelers had to confront was from the brigands. Russian roads teemed with robbers, kidnapers, and murderers. What the Russians called "taking advantage" was the only way to cross territory infested with highwaymen. In other words, it was prudent to travel en masse, or follow a military column (Troyat, 1970, p. 361). In the Smolensk district, it was necessary to organize sledge-caravans up to 500 vehicles before travel was considered safe. In the early 1700s, all roads near the city of Moscow were unsafe. The people were so frightened to travel that grass and weeds covered the dirt roads (Tolstoy, 1959, pp. 258, 442).

[9]Literally translates to shifting.

Just to change horses at every post-stop averaged about thirty minutes (Oliphant, 1854, p. 20). More patience was required on heavily traveled post-roads. For example, on the Byelorussian line, 1841, passengers had to wait for several hours at every stage (Giers, 1962, p. 115). It was necessary to reserve a seat weeks in advance if your route included important post lanes (White, 1904, p. 600). If was not uncommon to wait two or three days in Siberia for equipage. The unusual delays were due to the scarcity of horses and the regulations pertaining to animals. The Department of Post stated that all post-animals (horses, dogs, reindeer, and so forth) had to be rested for six hours at the ends of the run before being put back to work (Meignan, 1885, p. 53).

A second way to travel was na dolgikh. All equipment and driver were rented from the government for the length of the trip. It was less popular than changing at every stage, because horses and drivers had to rest and feed before heading for the road. Na dolgikh travel was restrictive for long journeys, but for short trips it was quicker than na perekladnikh (Baedeker, 1914, p. xxiv).

Another procedure in getting about on post-roads was by volnaya potchta (free-posting). Peasants were allowed to rent horses and carts to travelers for a fee since the government departed from its leasing policy in certain sections of Russia (Burnaby, 1989, p. 74). The service of free-posting

was about the same as the government's procedure except that peasant drivers were not as experienced as state employed ones. The professional yemstchiki called their counterparts okhotniki (amateurs). Inexperienced as they were, peasant drivers had several advantages over seasoned state postillions. Yemstchiki were not allowed to deviate from the post-road, whereas free-drivers were not prevented by law. They were hired out for a price to go anywhere at any speed at any time. Post-road, side-road, or back-road was their route. Because of this flexibility, land transportation to and from villages away from the post-roads was valuable (Morley, 1866, p. 56).

The government rate for posting was set by the state. In 1914, the cost was three to seven and one-half kopecks per verst per horse. At every post-stage, the gosudarstvenni sbor, the government tax, an additional fee of twenty kopecks was collected. The drivers expected a tip of twenty to thirty kopecks per stage and another five kopecks for the horse handler (Baedeker, 1914, p. xxiv).[10] Theoretically the state tax and rental equipage went back into the post-road fund for repair and maintenance projects (Gautier, 1905, pp. 363-64). Free-drivers, as a rule, had no set price. They received

---

[10] The post-stage money was collected in the early eighteenth century by The Chancellery of the Great Palace located in Moscow. The office collected all taxes, tolls, imposts, and so forth (Tolstoy, 1959, p. 250).

whatever the market was willing to pay (Morley, 1866, p. 56). To ride over the Russian post-road system was expensive. It was economical, on the other hand, if a poputchik (travel companion) shared the same post-cart (Murray, 1959, p. 354).

Free-Post Workers by Provinces. Although peasants participated in making extra income from the free-post, volnaya potchta was an industry controlled by the zemstvos. The Census of 1897 reported that 17,264 men and women worked in the free-post business as drivers. According to the official statistics, this occupation was classed by the authorities as part-time work. The state post-drivers, on the other hand, made their living exclusively from such work.

The distribution of free-drivers was the greatest in areas where distances were immense, inregions where population was sparse, and where railways were
tion was sparse, and where railways were few or absent. The free-post was located in almost every province. Out of 89 guberniias, there were 25 provinces where 200 or more workers were available to the riding public; eleven provinces between 100 and 200 workers; forty-six provinces with 100 or less workers; seven provinces had no free-post industry. In European Russia, the guberniias in the north, east, and south were large areas of employment, whereas around Moscow, St. Petersburg, and Warsaw provinces, free-drivers were not that significant. The large metropolitan areas had no need for

them since the state post-roads were well established with regular travel. The province of Irkutsk had the largest concentration of free-posts centers with 3,374 part-time drivers in Siberia. The government of Tobolsk was not far behind with several thousand laborers. In fact, all central Siberia and the far east provinces were well provided with equipage service for rent. (Figure 5.1)

Free-Post by Geographical Regions. In European Russia, the sparse regions had the greatest concentration of available free-post personnel. The regions of the Agricultural, Middle Volga, and Ural were particularly important. The settlements in these regions were widely spaced and the railways haphazard. The regions of Poland, the Baltic, and Lithuania in the west and northwest did not require extra workers in the transportation of travelers. The post-roads in these districts were well established. With regard to Siberia, the geographical regions of East Siberia and West Siberia were foremost in all of Russia in the free-post industry.[11] (Table 5.2)

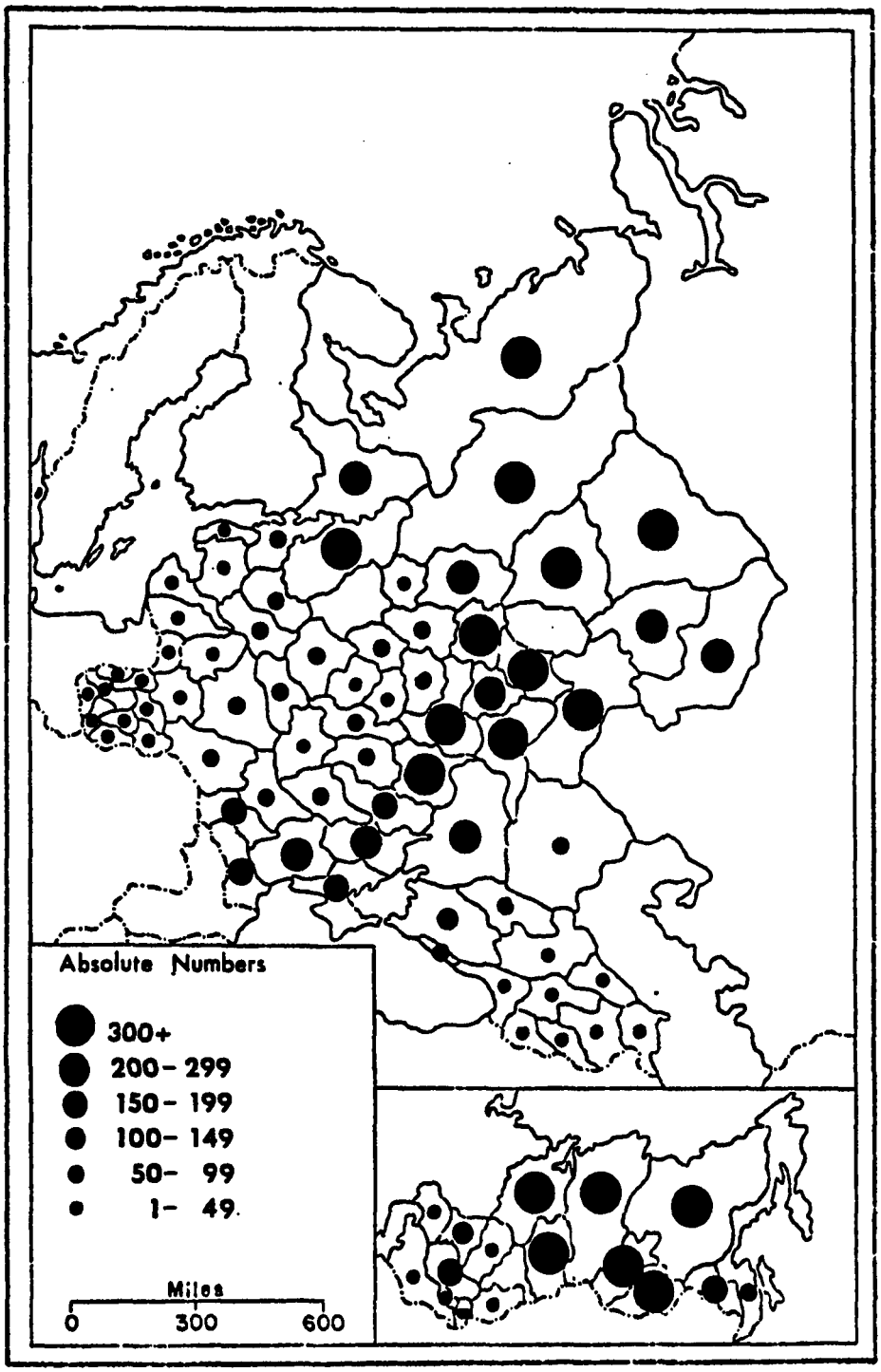
Post-Road Drivers. The professional yemstchiki were regarded as a Russian institution (Stephens, 1844, vol. 2, p. 193). "He is a distinct animal; the interior swarms with

---

[11]Appendix C details information on this subject.

Fig. 5.1

WORKERS IN ZEMSTVO FREE POST BY PROVINCE, 1897



SOURCE: Tsentralnyi statisticheskii komitet. Vols. 1-89. St. Petersburg, 1899-1904.

TABLE 5.2

WORKERS IN ZEMSTVO FREE POST BY GEOGRAPHICAL REGIONS, 1897

	REGIONS	NUMBER EMPLOYED MALE	FEMALE	TOTAL
1.	Agricultural	1,127	5	1,132
2.	Middle Volga	1,965	13	1,978
3.	Lower Volga	842	1	843
4.	New Russia	961	7	968
5.	Southwest	326	2	328
6.	Little Russia	298	2	300
7.	Industrial	592	2	594
8.	White	288	-	288
9.	Lithuania	82	-	82
10.	Lake	725	3	728
11.	Ural	1,511	-	1,511
12.	Baltic	44	-	44
13.	North	1,165	2	1,167
14.	Russian Poland	36	-	36
15.	Transcaucasus	363	1	364
16.	Central Asia	361	-	361
17.	West Siberia	1,964	13	1,977
18.	East Siberia	4,264	70	4,334
19.	Far East	229	-	229
	TOTAL	17,143	121	17,264

SOURCE: Tsentralnyi statisticheskii komitet. Pervaia vseobshchaia perepis naseleniia Rosskii Imperii 1897 g. Vol. 1-89. St. Petersburg, 1899-1904.

him; he 'works' every macadamized and unmacadamized road in Russia,from the shores of the White to the shores of the Sea and all roads are alike to him," (Morley, 1866, p. 88).

The Department of Post and Telegraph in St. Petersburg supervised all postillions. These knowledgeable roadmen first acquired their skills as apprentices. Sometimes their career started as early as six years of age, but the majority were recruited from twelve to fourteen years of age. Most of the regular mail-drivers were in their middle and late years (Morley, 1866, p. 88; Kohl, 1844, p. 85). There were entire villages where it was expected that the young men enter the driving profession. The supply of postal cart-drivers before Emancipation came from the landowners. They were hired out as yemstchiki to comply with the system of obrok, or service obligation (TCM, 1861, p. 370). In the mid-1900s, they were housed, clothed, and fed by the state (Spottiswoode, 1857, p. 31). Post-drivers in the first half of the nineteenth century earned up to 120 rubles (about $62.00) per year (Tolstoy, 1959, p. 212).[12] In 1860, the salary was sixty rubles (about $31.00) per year (TCM, 1861, p. 370). Those drivers who did not reside with their families in the station compound were housed in bachelor quarters, the yemshchichnaya dom, or postillion house that was provided by the government

---

[12] The private coachmen of the tsars in the early 1800s were from peasant families but given military rank and a salary of several thousand rubles per year (BEM, 1851, p. 167).

(Erman, 1848, vol. 1, p. 154). Most villages off the post-roads maintained one-room drivers' huts where free-post workers or freelance drivers could rest, eat, and relax (Tolstoy, 1959, p. 245).

The post-drivers of the state could be distinguished from the private coachmen by their uniforms. In the early eighteenth century, their driving coat was grey with the insignia of a Post and Horn in red cloth sewn on the back. The horn was carried on all mail-carts and was blown to announce the arrival of the Imperial Post Vehicle. When a jacket was not required, the badge of a spread eagle was worn on their chest (Weber, 1723, vol. 1, p. 115-16).

The costume in the nineteenth century was different. Over white linen trousers,the drivers wore a striped shirt and a bright yellow coat. To protect their hands, a pair of large leather gloves were worn (Erman, 1848, vol. 1, p. 73). On their heads, a high, narrow brimmed hat with the emblem of the Post completed their working outfits (Proctor, 1872, p. 8). The state postillions in Russian Poland wore a black braided green coat (Maxwell, 1850, p. 336). The passengers were provided with a long,heavy traveling coat because the travel was dirty and grimy (Herzen, 1968, vol. 1, p. 212).

All state post-men were exempt from the military and poll tax, a grand reward envied by those in other occupations

(Johnston, 1816, p. 17). It was no minor luxury since youthful and experienced drivers were killed or maimed (Holderness, 1823, p. 21). Also, horribly scarred faces and frostbite injuries were an ugly reminder of the demands of their profession (Molloy, 1905, vol. 1, p. 42). To prevent passengers from the same fate, especially night riding, the most skillful yemstchiki and best horses were issued after darkness (Spottiswoode, 1857, p. 146). Technically, the law stated that a government driver could be arrested and severely punished if passengers were injured (Hapgood, 1895, vol. 1, p. 314).

Although working for the Imperial Post provided personal benefits, their social status was low. In the mid-point of the nineteenth century, post-drivers occupied the fourteenth class, the lowest category in Russian society (Smucker, 1856, p. 186).[13] Moreover, a biased view among the aristocrats was that it was natural for poor ignorant peasants to enter coachmen and postillion occupations. For example, the Procurator-General of the Most Holy Synod, C. Pobedonostev, under Alexander III (1881-1894), was convinced that all land

[13]Fedor Skovronski, the eldest brother of Catherine II, was a postillion. He worked on the post-road between St. Petersburg and Riga. Later as Empress, she provided Fedor and several other family members with new names and titles (Waliszewski, 1897, pp. 280-81). Workers employed to repair roads, streets, bridges, including cartage also belonged to the lowest class (Alison, 1854, vol. 2, p. 136).

land carriers should come from the low class. He believed it was an inherited profession (White, 1898, p. 114).[14]

Travel Documents. To travel anywhere in Russia required confrontation with one of the most rigid features of the autocracy. Whether traveling ten miles or 100 miles, native or foreign, rich or poor, travelers needed a passport issued by the state. Russian citizens made application to the Ministry of Home Affairs, Department Two (Herzen, 1968, vol. 1, p. 457). Visitors went directly to the Bureau des Estrangers. All foreign passports were divided into five groups with a separate fee. The passport classes issued during the first half of the nineteenth century were (1) gentlement, (2) tourists, (3) merchants, (4) traveling servants, and (5) poor (Maxwell, 1850, p. 99). An internal Russian travel passport was from five to ten rubles and had to be renewed every year (LLA, 1884, p. 187). Russian merchants were allowed to travel abroad for three years according to the law of 1842 (Maxwell, 1850, p. 99). The exit passport cost 500 rubles in the 1800s (Kropotkine, 1881, p. 398).

The penalty for out of order documents was severe for

---

[14] It was impossible to determine the work force of yemstchiki employed by the Imperial Post because the Census of 1897 grouped all postal workers and telephone and telegraph employees together.

visitors. One was immediately arrested or expelled from the Empire. For citizens, the punishment was even worse. The Penal Statute 355 of the Criminal Code for 1868 stated that individuals would be exiled for life if they stayed beyond the allowed date (TAAC, 1869, p. 685). For the period between 1827 and 1846, the Russian Geographical Society reported that 48,466 citizens were exiled to Siberia because of internal passport violations, 40,000 were peasants, because they had merely left their villages to find employment (Kropotkine, 1884, p. 187). Mark Twain, the American writer, traveling in Russia in 1867, was told that foreigners should expect to show their travel papers, on an average of every forty minutes (Twain, 1867, p. 59).

Once the passport was approved, the Russian Post required a road permit, the podorozhnaya (Sears, 1881, p. 590). Free-posting did not required a road pass because government property was not being used (Burnaby, 1878, p. 74). The podoroshnaya stated the number of horses, the distance, and the fee per verst per horse. The Post issued three types of documents: (1) the "courier's" permit; (2) the "crown" permit; and (3) the "common" permit (Lansdell, 1882, pp. 134-35).

The post-station manager could lease additional horses than the original post-road pass stated if the weather altered the surface of the post-roads (Bremmer, 1839, vol. 2, p. 177). When the roads were good, the usual number of horses were three

per vehicle (troika); bad roads, six horses; very bad roads, nine horses or more (Sears, 1881, p. 591). The courier and crown passes were priority papers. These drivers wore copper badges on their hats and arms to show that they were in the service of the state and recieved whatever equipage they requested (Meignan, 1885, p. 52). The post-road podoroshnaya essentially served to monitor all movement and to prevent unauthorized roaming and loitering (Knox, 1879, p. 255).

Important Post-Roads

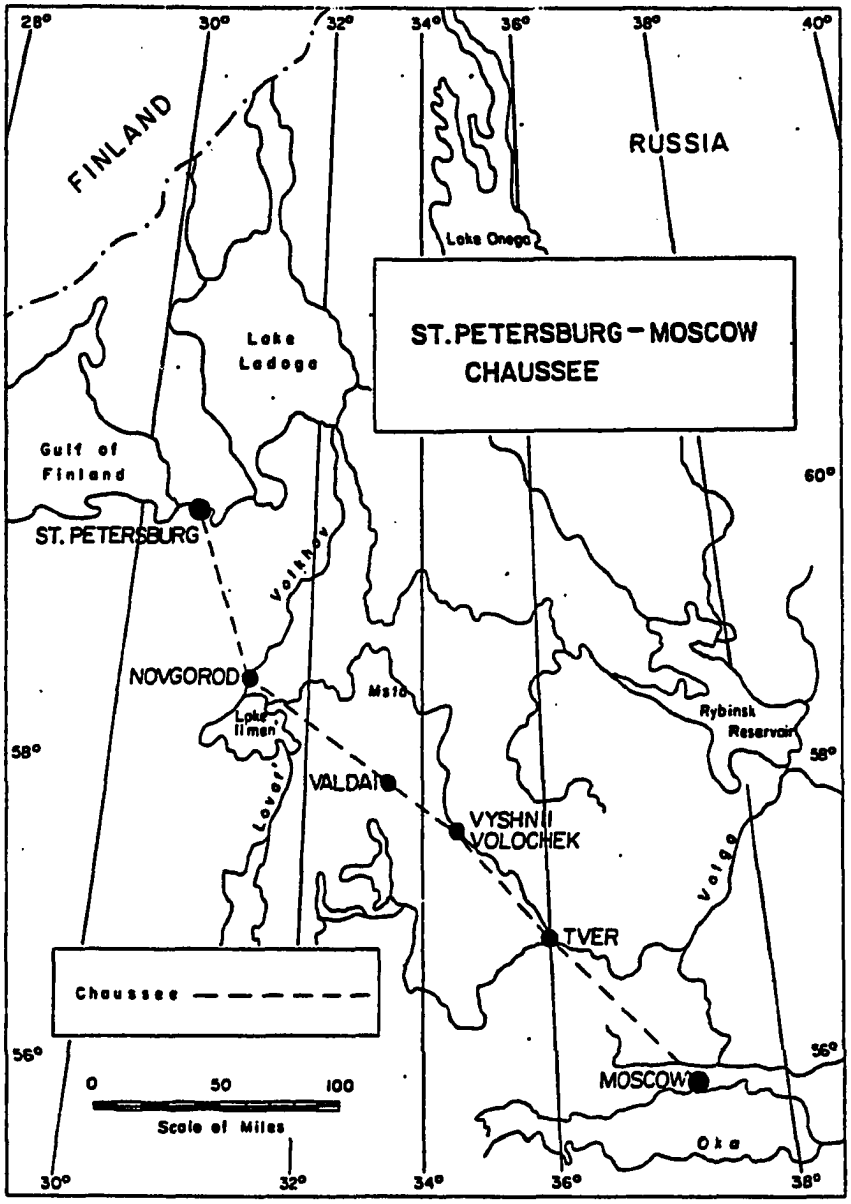
The Russian state was covered with thousands of miles of post-roads. Many of them took on special importance because of their location, which in turn determined their use. The lesser class routes were not very busy. The business on these thoroughfares were the usual post-cart runs and the occasional travelers. It was a different story on the main post-roads. The Department of Post in conjunction with the Department of Army and Department of Roads and Bridges cooperated in the operation of certain roads. In other words, some post-roads were also named military-highways and public turnpikes. These roads had to bear unusually large traffic densities. Of particular significance in the shaping of Russian history were the Moscow Highway, the Trans-Siberian Highway, and the Georgian Military-Highway.

Moscow Highway. The stretch between St. Petersburg and Moscow was a premier post-road, military-road, and public highway. It was built or improved by eleven monarchs. When paved with stone, it was Russia's first so called "super-highway" (emphasis added). In earlier times, the road was called the Avenue Road but was later popularized as the Moscow highway (Kozhin, 1975, p. 623).

Construction of the major thoroughfare was ordered by Peter I. The Tsar commissioned two Englishmen to survey a suitable route through the flat terrain that was covered with swamps and forests. The calculation was finished in 1710 (Perry, 1710, p. 281). Engineers, directed by a British technician named MacPherson, began construction in 1722. At first, the plan was to build 375 miles of direct road but had to be extended to 490 miles because of inaccessible topography (Haxthausen, 1856, vol. 1, p. 8). When the highway was complete, it was "straight as an arrow" (Coxe, 1803, vol. 1, p. 23). (Figure 5.2)

During Peter's time, only eighty miles were complete from St. Petersburg (Schuyler, 1884, p. 386). Labor for the early phase was a major problem since few people live this far north. Therefore, the work was performed by criminals, prostitutes, illegitimate children, orphans, and retired soldiers (Crisp, 1978, p. 312). It was normal for social malcontents to be assigned to public works in Russia such as road building

Fig. 5.2



SOURCE: Tsentralnyi statisticheskii komitet. Vols. 1-89. St. Petersburg, 1899-1904.

and maintenance (Auteroche, 1770, p. 341). The Office of Criminal Affairs was always a good source for road builders (Tolstoy, 1959, p. 609).

At first, the road was nothing more than a rough track, but the cut through the taiga (forest) soon began to take the form of a made road. In the early 1700s, the state built 24 yami (stages)[15] for civilians where the change of horses took place (Weber, 1723, voll. 1, p. 115). During the early construction, travel on the road was difficult, expensive, and lengthy. For example, the French diplomat, Campredon, in 1723, spent $1,200 and four weeks on the post-roads (Waliszewski, 1897, p. 410).

Work on the thoroughfare was sporadic by the succeeding rulers until Empress Elizabeth (1741-1761). The Office of Construction of State Roads was formed primarily to complete this project and several smaller ones. Over twenty million rubles were allocated for the road (Yanovskii, 1893, p. 54). Tsarina Catherine II (1762-1796) in 1786 ordered four million rubles solely for repair to the post-road (TEB, 1823, p. 389).

Tremendous expense for maintenance and repair had to do

---

[15] Yam, which yemstchik was derived, was not of Russian origin but Mongolian. The founcation of the Russian post-road system was left behind by the Mongol Empire (1238-1462). During the rule of Kahn Ugedey, Mongol law required that a certain number of draught animals and vehicles, including drivers, were to be stationed at every yam, or post-stage (Vernadsky, 1953, pp. 127-28).

with the nature of Russian road building and the terrain conditions. In order to travel vast tracts of bogs and swamps it was required to build perespektivnaia doroga, or corduroy roads. In the middle of the eighteenth century, the first 100 miles from the capital was logged (Stoddard, 1899, p. 119). According to one estimate, it required 2.1 million tree trunks twenty feet long to complete the distance (Hanway, 1753, vol. 1, p. 93). Most of Russia's other post-roads, where ground was soft or wet, were also corduroy-types (Tooke, 1801 vol. 3, p. 257).

The corduroy concept of paving was used extensively along the entire Moscow Post-Road. Slender pine trees from three to five inches thick were standard. The logs were laid parallel across the ground and secured on both sides and in the middle. Then about five inches of earth and sand were thrown over the wood base and smoothed (Auteroche, 1770, p. 131). To give vehicles a quiet roll and to lessen the jolting, branches and leaves were strewn over the roadway (Erman, 1848, vol. 1, p.79). But when the tree trunks rotted or subsided, travel was fearsome and caused the vehicles to shake violently (Molloy, 1905, p. 41). Except for about 100 miles, the most important road in the land, before it was paved with stone, was primarily a log-road (Cochrane, 1825, vol. 1, p. 84).

In 1776, the width of the post-road was ordered to be

twenty-five sazhen[16] (about 175 feet) across and the carriage-lane in the center 10 sazhen (about 70 feet) in breadth (Semenov, 1859, p. 60). The carriage-road was separated by parallel ditches 13 to 14 feet wide (Auteroche, 1770, p. 29). On both sides, an additional 25 sazhen of land was cleared. In all, the Mostcow Post-Road measured 60 sazhen (about 420 feet) broad (Semenov, 1859, p. 60). To guide the way for travelers in winter, the road was marked out with fir saplings set into the snow about 20 yards apart on both sides. It was figured that 128,480 trees had to be cut every winter for this purpose (Hanway, 1753, vol. 1, p. 92).

Macadamization of the Moscow Road. The Count Arakcheev, Chairman of the Committee on Highway and Construction and Planning in the first decade of the nineteenth century, proposed that the road be paved with stone. Tsar Alexander I (1801-1825) approved the plan and the project got underway in 1817 (Blackwell, 1968, p. 268). By 1825, only the stretch from St. Petersburg to Novgorod was weatherized, a distance of 119 miles (SIRIO, 1896, p. 555). Under Alexander's leadership, approximately 340 versts (about 226 miles) were macadamized (Semenov, 1859, p. 296). It was not until 1834 that

---

[16]One sahzen is equivalent to seven feet.

the Moscow Post-Road was entirely weatherized (Golovine, 1846, vol. 1, p. 106).[17]

The application of stone in the final years was supervised by Alexander Frederick, Duke of Wurttenburg, the Director of Transportaiotn during the reign of Nicholas I (1825-55). It was estimated that the state put out 22.5 million rubles (about $11,587,500) to macadamize the road. When broken down into rubles permile, the new white highway cost 49,889 rubles (about $25,693) per mile, an expensive cost at that time (Yanovskii, 1893, p. 54).[18] The paved highway measured 728 versts (about 525 miles) when finished (Maxwell, 1850, p. 194). From Moscow, the highway began at the St. Petersburg Gate at the far northern end of Moscow's main boulevard, Twerskaia Prospekt, and entered the capital from the south at the Moscow Gate (Young, 1879, p. 491).

The Russian government had no choice but to spend an immense amount on their year-round road due to the scarcity of good paving stone in the northwest of the Empire. The laying of crushed rock was not easy. Granite boulders had to be

---

[17] In Russian terminology of this period, shosseii on maps indicated main routes of first class and were macadam highways. Therefore, any highway generally meant a paved road.

[18] The average cost of Russian railways in 1861 was $163,422.00 per mile (TBM, 1867-1868, p. 661).

conveyed to construction sites from great distances in sledges and carts. In winter, the rock was exposed to severe cold that caused it to be brittle and that shattered by fire. In summer, the old-fashioned method of men swinging hammers broke the stone into suitable sizes (Murray, 1859, p. 155).

The all-season highway was wide and handsome. The hard carriage-road was an elevated embankment (highroad) with a rough outline of the dirt roadway on each side to handle carts and cattle (Murray, 1849, p. 530). An impenetrable thicket lined the road from the adjoining forest (Erman, 1848, vol. 1, p. 79). There were several hundred small wooden and stone bridges between the two cities (Bremmer, 1839, vol. 2, p. 16; Bourke, 1846, p. 35). Dark granite verst-posts, eight feet high, were set into the ground on both sides of the highway at every verst (Coxe, 1803, vol. 2, p. 25).

The Moscow Highway did not pass through a city or village, but exit gates were not far from the settlements (LLA, 1848, p. 361). To accommodate travelers, the state built thirty-nine post-stations (Murray, 1849, pp. 520-36). To keep the road maintained, retired soldiers lived in 100 repair huts several yards from the main roadway. The maintenance sheds were built every seven or eight versts (about five or six miles) and were supplied with iron plows and road graders. Every shed housed one road inspector (military rank) and a complement of soldiers. Because the Moscow Highway was a

showpiece, the maintenance depots were attractive structures, that were all painted yellow (Bremmer, 1839, vol. 2, p. 16). Moreover, the government provided small stone benches at regular intervals for pedestrian travel (Maxwell, 1850, p. 182).

In 1834, after seventeen years of struggle and hard work to weatherize the road, the Russian Empire claimed its first scientifically built highway. It was proclaimed as one of the best built thoroughfares in Europe (Golovine, 1846, vol. 1, p. 106). Another comment was that, "The road throughout the whole distance to Moscow, is, without exception one of the finest in the world" (Bremmer, 1839, vol. 2, p. 315). Nevertheless, it took carriage and horses from 80 to 10^n hours to gallop over the macadam road (TRG, 1870, p. 16).[19] By Imperial Post, it required about 100 changes of horses (Morley, 1866, p. 43).[20]

The Trans-Siberian Post-Road. Until building the Trans-Siberian Railway, bureaucrats, merchants, carters, soldiers,

---

[19]The train between the two cities averaged 25 miles per hour in 1910 (CR, 1910, p. 914). The 403 miles were accomplished in fifteen hours (Dobson, 1890, p. 24).

[20]The road today is known as the Leningrad-Moscow Highway, 446 miles in length. To the motoring Soviet public, the highway is Route 10 (author).

and civilians relied upon the extensive post and military Siberian highway.[21] By 1698, the road extended as far as Nerchinsk (Fuhrmann, 1972, p. 216). In 1762, Catherine II ordered that a more logical route be prepared and to connect the important Siberian cities. The route went through the cities of Nizhni-Novgorod, Kazan, and Perm in the late 1700s (Auteroche, 1770, p. 69). To raise money for the project, a head tax of twenty-five kopecks was levied on the residents who lived in the districts where the road was to be built (Holman, 1834, vol. 2, p. 159). Prince V. V. Golitsyn, a close friend to Peter the Great, was a driving force in the building of Siberia's post-roads (Fuhrmann, 1972, p. 216).

When completed in the late nineteenth century, the Siberian Highway was possibly the longest continuous road in the world. From Moscow east to Irkutsk a traveler had to endure 9,042 versts (about 5,995 miles) of cart riding by government post (CR, 1897, p. 633). From Nizhni-Novgorod to Irkutsk, a distance of 5,114 miles, the Department of Post maintained 250 post-stops, employed 4,000 drivers, owned a fleet of 8,000 conveyances, and stabled 10,000 horses during

---

[21] The road went by several names--the Sibirsky Tract, Trans-Siberian Highway, Great Siberian Road, Great Siberian Post-Road, and Great Military-Highway.

the late nineteenth century (Kennan, 1910, p. 453).[22]

The Siberian Highway was never entirely paved, but stretches were improved with stone between the important post-stops. The part-earth, part-log, part-stone, and natural surface was rough or smooth, hard or soft, muddy or dry, depending upon the weather (Gautier, 1905, vol. 2, p. 364). As a rule, the post-road proper in western Siberia was ordered to be twenty-one feet across (Vladimir, 1899, p. 271). Considering the length, the Siberian Highway, the gateway to the east, amy have been the most expensive road constructed at that time or perhaps ever. An official report estimated that the final bill was about 940,259,410 rubles (approximately $484,554,415.00) (CR, 1904, p. 847).[23] It was said that even the Romans, great road builders that they were, never attempted to build a highway of the magnitude of the Siberian Post-Road (Wenyon, 1896, p. 16).

---

[22]Since warring tribes lived along the road, plus colonies of exiles and roving bandits, the state encouraged Cossack mercenaries to reside near the highway to protect travelers and post-stations (Russia, 1918, pp. 16-18). In the eighteenth century, on the stretch near Ekaterinburg, it was said that murders occurred every day (Auteroche, 1770, p. 85).

[23]The Trans-Siberian Railway, 5,486 miles long, exceeded 500 million rubles (about $257,500,000) to complete (Gautier 1905, vol. 2, p. 293).

The Georgian Military-Highway. Catherine II foresaw the importance of the ancient horse-path between Vladikavkaz (today Ordzhonikidze) and Tiflis (today Tbilisi) that was to become the Georgian Military-Highway (also post-road and public highway). Crude wheel locomotion was possible in 1783 (Dobson, 1890, p. 78). Credit for the completion of the Georgian Military-Highway at this time was given to General Alexey Yermovlov (Kelly, 1978, p. 135). It was built by a brigade of 800 Russian soldiers (Maud, 1908, p. 90).

The Georgian Military-Highway received high priority from three succeeding emperors between 1811 and 1864 (Alexander I, Nicholas I, and Alexander II). The macadamization of the road was started in 1859. The road was paved and widened enough for two carts to pass each other. A retaining wall two feet thick and three feet high was ordered to prevent careless drivers from falling into the deep canyons (Meeker, 1886-1887, p. 912). In the 1900s, it required two days to cover the 145 miles by post-cart (Baddeley, 1908, p. 20).[24]

Since the highway was built for moving guns and troops, no amount was too extravagant. The strategic highway had to traverse gorges, defiles, and high mountain passes, one of the

---

[24] An expert on Imperial Russia's transportation service proclaimed that the Georgian Military-Highway was the best road in Russia, and the Vorontzov Highway in the Crimea the second best (Dobson, 1890, p. 82).

most rugged terrains in all of Russia.[25] When completed, the road cost almost 20 million dollars or $137,931 per mile. The fantastic expense caused Alexander II (1855-1881) to remark that when he rode over the highway that he saw golden verst-posts (Norman, 1914, p. 188). The highway was a striking instance of engineering, a fact upon which few would disagree (CM, 1892, p. 189). After the building of the Vladikavkaz-Poti Railway in 1883, the Georgian Military-Highway, as an economic and strategic artery, lost its importance (Zadvorny, 1980, p. 257).[26]

Conclusions

The Russian post-road system was an immense organization conceived to provide government to the inhabitants. The

---

[25] The route of the highway followed the Aragva Valley. The road itself was built on the left bank of the Terek River (Kelly, 1978, p. 76). The highest point on the road was 7,813 feet above sea level (Howe, 1968, p. 238). The Soviets still call the road the Georgian Military-Highway. It is now used primarily by the local inhabitants and as a sightseeing road for tourists because of the spectacular view atop the Caucasus Mountains (author).

[26] A smaller road, but no less important, was the branch off the Moscow Highway, the Tsarskoe Selo Road. The 16-mile thoroughfare was ordered by Catherine II to carry the seat of government to the summer residence. Technically, the Tsarskoe Selo Road was not a post-road, but travelers first had to pay the toll at the Moscow Gate in St. Petersburg and turn off at the exit to the summer palace. The road cost 100 million rubles to build (Sears, 1855, p. 272). In the early 1800s, the road was marked with marble, jasper, and granite verst-posts. The road was lighted with 1,000 round lamps when court was in session (Bigland, 1812, p. 470). Wheel travel diminished when Russia's first passenger railroad was constructed in 1837 (Maxwell, 1850, p. 118).

operation and management of thousands of miles of mail-roads, drivers, horses, and vehicles, not to mention support personnel, spawned an intricate bureaucracy. Despite inclement weather, bad roads, and normal overland travel inconveniences, the mail and people were able to move about the Empire. The government provided the public with several categories of postal routes based upon their importance. The major post-roads connected provincial capitals and large cities, whereas the other classes of post-roads serviced remote agricultural, mining, and lumbering settlements.

When the Department of Post went into the service of carrying passengers, it was operated exclusively by the state. It was a matter of time and prudent business practice that forced St. Petersburg to relax its monopolistic policy regarding passenger conveyance and to allow competition. This gave rise to free-posting, a capitalistic enterprise that employed thousands of part-time workers to earn extra income carrying passengers. The free-post concept was not so much a challenge to the state but arose because of the need to extend the lines of communications in sections of the Empire where the post was not available. It was a necessary service and a valuable contribution to land transportation. The bulk of free-post carriage was managed by local zemstvos.

Free-drivers were not as experienced as professional postillions. They were, perhaps, the best drivers as a group

anywhere in Tsardom. Taken into the craft at an early age, their conditioning and training helped them survive the rigors of driving. They were tough, hard-nosed, and grizzled men (and some women) but no better person could be relied upon to take travelers and mail galloping across the Empire's post-roads.

Despite the complex but efficient operation of the postal system, traveling was made somewhat frustrating because of internal and external passage credentials. The inhabitants and visitors were confronted with an array of red tape that was required to move about the Empire. Expulsion, imprisonment, or exile was the fate if the documents were improper.[27] In the end, the one glory of travel in Imperial Russia was the intimacy established with the countryside when either posting or free riding.

---

[27]Internal travel in the USSR today in many way resembles that in Tsardom. A variety of forms must be filled out and rules followed, not to mention the aspects of road driving restrictions. Foreign motorists can bring their motor vehicles but may drive only on approved routes and in accordance with a preapproved tour itinerary. Any deviation will cause serious problems to the visitor. At the exits of all towns are posted militia men. The main purpose is to check traffic. They are empowered to stop all vehicles. All road routes for foreign travel are planned by Intourist (Upravlenie po Inostrannomii Turizmu pri Sovete Ministrov S.S.S.R., or Dictoriate for Foreign Tourists with the Council of Ministers of the U.S.S.R.), an organization set up in 1929 to earn money from foreign travelers (Konigsberger, 1968, pp. 17, 80).

CHAPTER VI

THE STATE PUBLIC HIGHWAY SYSTEM

Introduction

Coordinated land transportation throughout the Russian Empire was vested in several ministerial branches of government. The post-roads were supervised by the Ministry of Interior, Department of Post and Telegraph, and the military-roads were supervised by the Ministry of War, Department of the Army. With regard to the Empire's public thoroughfares, the responsibility was with the Ministry of Ways of Communications, Department of Roads and Bridges.

The public highways primarily connected the major cities of the Empire. These roads were opened first as trade routes and later, as Russia matured, for social intercourse. The public ways accommodated the general community at large. On such roads, one saw carriages of the aristocracy, public diligences, carts and sledges of the peasantry, freight wagons of carriage artels carrying natural resources, manufactured articles, foodstuffs, cattle drives, pedestrians, and so forth. In other words, the public highways were the main channels of transportation and communication for the general public.

As political reform was encouraged in the later years of Tsardom, significant responsibility for Russia's public thoroughfares was shifted partly from the central government to the local administrations. In due time, the roads that were built to serve the general public greatly diminished in their use and construction with the acceptance of railway transportation. In previous times, the public ways were important conduits that Russian society depended upon but were later relegated to the position of stand-by roads.

This chapter attempts to look at the development of the state public highway system, and its decline in regard to the overall land distribution and transportation network in Imperial Russia.

The Public Highway Organization

All of Russia's public roads were planned, funded, and built by the Ministry of Ways of Communications, Department of Roads and Bridges.[1] Travelers and visitors to St. Petersburg easily recognized the Ministry by the flat atop its headquarters. The flag was red, white, and blue with a crossed axe and pick as its insignia. It was customary for

[1]The Ministry of Ways of Communication also planned the Empire's water and rail transportation facilities. See Appendix D for names and dates of Russia's ministers who were responsible for the development of the public highway network.

the flag to be visible at all construction projects (Simpson, 1898, p. 111).[2]

In the mid-nineteenth century, the Department of Roads and Bridges codified all state thoroughfares under its jurisdiction into five categories: (1) First Class--main communication roads, (2) Second Class--roads of great trade, (3) Third Class--regionally important provincial roads, (4) Fourth Class--local trade roads, and (5) Fifth Class--rural field-roads and bridle paths (Ivanovskii, 1893, p. 54).[3] Because of Russia's admiration for France's road system, St. Petersburg's bureaucracy and highway classification were similarly patterned (Chancery, 1897, p. 116).[4]

---

[2]An uncomfortable condition, which hindered establishing a more effective public highway system from regime to regime, was the graft, corruption, and inefficiency of the officials in the Department of Roads and Bridges (BEM, 1890, p. 119). The evils of irresponsibility and favoritism were also deep in the operation of the post-roads. A lack of leadership was even seen at the highest level of administration. The appointment in the nineteenth century, for example, to the directorship of the Department of Post and Telegraph was considered an insignificant position (BEM, 1851, p. 165).

[3]Russian maps identified First Class paved public highways either as shossenii (Russian for highway) or chaussee (French for highway). Many of the main public roads were also post-roads and military roads. The Moscow Highway was all three.

[4]Probably the most modern public road system during the nineteenth century was in France according to the American consul in Paris. He concluded that because of an efficient overland transportation network, the benefit to the state was greater than that of the French railways (TMB, 1892, p. 171).

In the first half of the nineteenth century, six cross-country routes, all paved with macadam, were First Class thoroughfares: (1) St. Petersburg southeast to Moscow (480 miles); (2) Moscow east to Nizhni-Novgord (325 miles); (3) Moscow south to Kiev (480 miles); (4) St. Petersburg south to Vitebsk then south to Kiev (675 miles); (5) Moscow west to Brest-Litvosk (620 miles); and (6) St. Petersburg southwest to Kovno (400 miles) (Soloveva, 1975, p. 28).

All other highways were connected to the main roads at strategic junctions. The public highways in Siberia took on special significance, both in category and function, because of the immense distances and few people. Although they were integrated in the overall scheme of organization after 1900, Siberian public roads were recognized by the following:

(1) Main Roads--primary thoroughfares that connected the different provinces and between major cities;

(2) Caravan Roads--routes that bordered Turkestan and Mongolia over which cattle were driven to main Trans-Siberian depots;

(3) Local Roads--minor but important rural ways that extended between key towns and villages where zemstvos were located;

The remarkable highways were started by Napoleon I and completed by Napoleon II (TMB, 1893, p. 244). The Emperor Napoleon I spent 15 million dollars on highways and another six million dollars for bridges (Pope, 1898, p. 168).

(4) By-Roads--connected remote settlements with no semblance of being made;

(5) Commercial Roads--carried local goods from chief towns and stretched far into the interior;

(6) Colonization Roads--routes that conveyed new immigrants and were built when necessary (Russia, 1918, p. 17).

The colonization roads were significant since they opened wilderness areas to settlers. An idea of the interest taken in building colonization routes, for example, in the Primorski District in far eastern Siberia between 1902 and 1912 cost the state $1,253, 532.00 (CR, 1913, p. 113).[5]

---

[5]The relationship between the Russian penal system and road construction was close. Colonization roads were a euphemism for land routes into Siberia and elsewhere for exiles and criminals. Not only did they travel over them but in many instances they built them. The origin of exiled road crews was with the Empress Elizabeth in 1754 because she detested executions. Insteads, criminals were banished to Siberia as colonists (LLA, 1851, p. 253). Exiles were of three distinctions: (1) Katorshniki, or criminals against the state; (2) Soslanniye na rabotu, or must be confined before settlement; (3) Soslanniye poselenie, or to be settled immediately (Haxthausen, 1856, vol.1, p. 26). When sent to Siberia, it was almost certain that road building or road repair was to be part of the punishment (BEM, 1874, p. 169). All criminals were first transported to Tobolsk, where prison officials decided their final destination. The post-roads were used for conveying exiles. In the neighborhood of every post-stage were other small buildings for resting and feeding the traveling criminals (Erman, 1848, vol. 2, p. 80). The board placed all convicts into major and minor offenses. Highway robbers, as an example, were in the first category and sent to Irkutsk province (LLA, 1851, p. 254). The irony was that road bandits were sentenced to build highways and post-roads (Heard, 1887-88, p. 931). The offenders of minor crimes were placed into five occupations: (1) labor

Public Highway Travel. The ride over Russia's public roads was not free. Travelers had to pay the shosseiinii sbor (highway tax), a fee paid at every turnpike gate before admittance onto the road (Baedeker, 1914, p. xxiv). Unlike riding on the post-roads where the cost was determined on the number of horses per vehicle per verst, the turnpike toll was based on so many kopecks per horse per 10 versts (about six miles). Also, the shosseiinii sbor was different in various parts of the state while the posting rate was somewhat regular throughout the Empire (Gautier, 1905, pp. 363-64). Over a four-year span, 1860-1864, the Department of Roads and Bridges collected from all its turnpike gates 3,792,903 rubles (about $1,953,345.00) per year (BCR, 1867, pp. 628-29).[6]

All responsibility and equipage pertaining to travel on public roads was not with the government but rested entirely with the travelers. Conveyance, driver, and horses were not rented out to passengers as they were on the post-roads.

---

gangs, (2) public works, (3) manufacturies, (4) domestic servants, and (5) colonists to till the land (LLA, 1851, p. 254).

[6]The state in turn charged a toll to users of the Empire's main waterway channels. Between 1860 and 1864, the Ministry of Ways of Communications received from its stations 3,465,381 rubles (about $1,784,671.00) for navigation dues (BCR, 1867, pp. 628-29).

Russia's public routes were open to anyone with or without conveyance or animals. High-born travelers, Tatar carters, Ukrainian grain trains, Polish coal carriers, Jewish hawkers, Asian cotton caravans, pack horses, and so forth plied wares and goods to all parts of the Russian Empire. The designated commercial routes were always crowded with carriers either taking or bringing merchandise to the consuming centers. It was natural to see droves of horses, oxen, goats, sheep, pigs, ducks, and the like being driven from the countryside to the cities to be sold. The public roads served all groups, any conveyances, any commodity, night or day, winter or summer.

Being the economic lifeline of the Empire, the public ways of all description were always heavily traveled. Conditions for the thousands of poor inhabitants who walked were especially difficult. On the dirt lanes in summer, it was normal to see road walkers cover the lower part of their faces with pieces of cloth because of the fine, thick dust in the air due to the volume of traffic (Haxthausen, 1856, vol. 1, p. 71). The dusty road conditions caused a range of unhealthy situations. Inflammation of the eyes known as "opthalmia" was one. This illness was virtually impossible to prevent unless passengers were to sleep or keep their eyes shut for long periods of time (TER, 1844, p. 362).

Another unique difference between travel over Russian public roads and post-roads was the rest facilities. Road-houses along the post-roads were routinely organized at relay stations where changes of equipage occurred. On the public highways, conversely, guest inns were extremely rare (Haxthausen, 1856, vol. 1, p. 89). Only on several major highways were privately owned houses of public accommodations available.[7] Therefore, long-distance driving required good-natured peasants living along the highway to provide the necessary amenities for passengers and feed for the animals, for a price of course (BEM, 1855, p. 280).

Since hotels and relay stops for horses were unknown on the majority of turnpikes, a peculiar but necessary Russian custom arose. Most seasoned travelers would not dare undertake a journey without the pogrebets, a box of supplies that could be purchased at any shop. The pogrebets contained a small teapot, sugar cup, sugar, tea, two glasses, two small plates, one spoon, and an ink bottle and writing paper (Haxthausen, 1856, vol. 1, p. 91).

---

[7]Along the entire length of the Moscow Highway, a distance of 480 miles, special houses other than normal post-stops were built exclusively for the convenience of Emperor Alexander I (BEM, 1851, p. 167). Alexander I had the reputation as the "traveling Tsar" (emphasis added). It was said that he traveled over 150,000 miles on the public and post-roads during his lifetime (Harper's, 1854-1855, p. 213).

Macadamization of the Public Roads

If there ever was a golden age of public road construction and paving in Imperial Russia, it was during the rule of Nicholas I (1825-55). At this time, the importance of railways was not yet understood and the rail lobbyists were weak.[8] The government embarked upon an ambitious road paving construction program unparalleled in Russian history. Tsar Nicholas I was convinced that macadamization of Russia's important roadways would profit both the state and the ordinary citizen.

It must be enphasized that Tsar Alexander I (1801-25) was the first monarch to realize that the effect of rasputitsa could be offset by the building of strong road surfaces. He ordered that Russia's two premier cities, St. Petersburg and Moscow, be kept open all year by having the stretch of road stoned. The project that began in 1817 was completed in 1834 while Nicholas I ruled.

Soon after taking office Nicholas I took steps to reform the Empire's department that was responsible for road building (Harper's, 1854-55, p. 215). Nicholas I ordered a special commission to recommend transportation improvement

---

[8]During the Great Railway Debates, many well-placed officials favored road construction over rail transportation. Opponents argued that steam locomotion was "faddish" and only a "toy." The new invention was also rebuffed by land carriage groups because they feared their jobs would be taken away.

for the country. From this influential body, the prevailing view was that railway building be temporarily suspended and financial investments be put into providing hard-surfaced roads. Following the advice of the commission, the Tsar catapulted Russia into modern ground transportation with weatherized highways.[9] No tsar after Nicholas I would equal the accomplishment of paving the Empire's public roadways (Soloveva, 1975, p. 25).[10]

Government highway strategists were optimistic and planned for over 17,747 versts (about 11,766 miles) of new macadam public thoroughfares, approximately 6,000 versts (about 4,019 miles) of paved roads were constructed, a significant accomplishment at that time (TRG, 1887, p. 265). Over 100 major cities in European Russia were connected with year-round highways, whereas locomotion before was dubious during rasputitsa (SIRIO, 1893, p. 556). Table 6.1 shows the chief public highways of main

---

[9]Because of his penchant for public works projects, Tsar Nicholas I is often remembered as the Tsar Engineer.

[10]If there wasn't such great duplicity and intrigue among high officials, the program to provide more public paved highways would have continued during the rule of Alexander III (1881-94). The Tsar appointed Herr von Reuten, Minister of Finance, to act as president of several commissions set up to promote reform. But because of the arbitrariness of the commission on roads, the committee failed to continue the highway policy set by the preceding administration (TAR, 1881, pp. 276-77).

TABLE 6.1

MAJOR HIGHWAYS CONSTRUCTED
FROM 1825-1850

DIRECTION	DISTANCE Versts	Miles
Macadam Highways Open		
1. St. Petersburg vicinity	254.0	168.0
2. St. Petersburg to Moscow	677.5	449.18
3. Moscow to Yaroslavl	247.7	164.26
4. Moscow to Nizhnayavo-Novgorod	391.2	259.4
5. Moscow to Podlolsk and Tula to Orel	336	222.7
6. Voronezh toward Zadonsk to Bestushevo	41	27.18
7. Moscow through Maloyaroslavets, Roslavl and Brobruisk to Brest-Litvosk	999.7	662.83
8. Brobriush to Mogilev	105.2	69.78
9. Kiev to Brovary	13	8.6
10. Village of Dovsko (on the Moscow-Warsaw Highway) through Mogilev and Vitebsk, to Ostrov on the Dinaburksi highways	498	330.1
11. Smolensk through Moscow to the Dnepr River	43	28.5
12. The Feofilovo Hermitage to the Dinaburski Highway to Novgorod	119	79.0
13. Village of Chudovo to the Tukhvin district border	36	23.8
14. St. Petersburg through Dinaburg to Kovno	707.5	469.0
15. Belostok to the village of Zhelatkov to the border of the Polish Kingdom	12	7.9
16. From the Russian border through Taurogen to Shavli and from Yenyshek through Mitav and Riga to the village of Engelgardtsgov	215.7	143.0
17. Mitva to Shet River in Polangeski	4	2.6
18. Pskov to Riga	232	153.8
19. On the Ruzhsko highway from the village of Shavli to Yenyshek	36.5	24.2
20. Godilovich, on the Moscow-Warsaw Highway, through Chernigov toward Kiev to Brovar	289.2	191.7
21. Kiev through Zhitomir to Brest-Litvosk	548	263.3
22. In Kiev, along the Dnepr River	6	3.9
23. Roslavl through Smolensk to Butebsk	216.5	143.5
24. Orel to Kursk	146.7	97.3
25. Along the Voronezh highway from Zadonsk toward the village of Bestushevo	41	27.1
Total length of roads macadamized	6,175.4	4,019.0

SOURCE: *Istoricheskoe obozrenie putei soobshcheniia i publichnykh zdanii s 1825 po 1850 g.* Sbornik Imperatorskogo Russkogo Istoricheskogo Obshchestva, XCVIII (1896), pp. 555-556.

communication that were weatherized.[11]

At first, the realization of "paving Russia" (emphasis added) was slow. While the Moscow Highway was near completion, surfacing the St. Petersburg-Riga Highway was underway. When completed in 1846, the stoned road was 500 versts, or approximately 331 miles (Bourke, 1846, p. 120). Although small stretches of roads were paved in the beginning, the Russian Empire had only two first class highways that were completely paved by 1847. (Figure 6.1)

Although the last half of the nineteenth century was a time of expansion of the public highway network with paved roads, it was far too small for such an immense land mass. It was calculated that only 34 versts (about 22 miles) of hard-surfaced roads were opened every year in the 1830s. Between 1840 and 1860, approximately 258 versts (about 172 miles) of road stretches were macadamized. The pace slowed in the 1860s when only 105 versts (about 70 miles) of weatherized pavement were built. After 1866, Russia's highway construction program almost came to a halt. In the early 1880s, increments of no more than fifteen versts (about ten miles) of paved roadways were opened to the public (Yanovskii, 1893, p. 55). Figure 6.2 shows the paved roads in 1886.

---

[11] Many miles of dirt roads were also planned, but figures could not be ascertained.

Fig. 6.1

SOURCE: Bourke, 1846, p. 120.

Fig. 6.2

SOURCE: Karta tamozhennkh uchrezhdenii Rossii po svdniyam kb Yanvarya 1886 g. St. Petersburg.

By 1896, the Ministry of Ways of Communications, Department of Roads and Bridges, administered some 14,878 versts (about 9.861 miles) of public thoroughfares (SS, 1897, p.34). Most of these roads connected major commercial cities. Nonetheless, large districts of the Empire remained without adequate year-round pavements. In such areas, rasputitsa continued to threaten local and regional economic development. In 1908, for example, twenty-one provinces in European Russia, one in Poland, two in Caucasia, and twenty in Central Asia and Siberia, did not have any first class highways stoned (SE, 1910, pp. 467-68). The expansion of the public road network in 1905 is shown in Figure 6.3.

Local Control of Roads. With increased dependence on rail transportation, the main highways managed by the state soon began to lose their economic value and subsequently to become a financial burden. This condition caused highway authorities to remove public routes from its jurisdiction and move them over to zemstvo control. Conditions for the transfer were for 25 years with periodic evaluation of the exchange. If the state decided that roads were not used as before, they were left to be covered over with brush, grass, and weeds. The rural boards also were empowered to abandon any

Fig. 6.3

SOURCE; Karta zhelznkh shosseinkh i vnutrennkh vodnkh. Putei Soobshcheniya Evropeiskoi Rossii. Isdanie Ministerstva Putei Soobshcheniya 1905 g. St. Petersburg.

thoroughfares if they were useless and the upkeep expensive (Yanovskii, 1893, pp. 54-56).[12]

When the Russian Empire came to an end in 1917,[13] the state and zemstvos together maintained about 75,000 miles of roads, out of which only about 15,000 miles were macadamized (GR, 1917, p. 13).[14] What was once an enthusiastic approach to highway modernization during the nineteenth century floundered in the twentieth. The impact of railway construction was to great to continue building overland roadways. (Table 6.2)

The Decline of Public Road Construction

Without question Russia's public highway program declined precipitously with the development of railway transportation.

---

[12]The Ministry of Interior also had the authority to remove post-roads from its roles when they no longer served their purpose and arranged for the local councils to operate them as they saw fit.

[13]Shortly after the Bolshevik Revolution of 1917, "Road Day" was inaugurated by the new Soviet regime to get the country out of its land transportation backwardness (Martin, 1945, p. 273).

[14]Jesse, Clarkson, A History of Russia, wrote that Tsardom developed a national highway network of 20 million miles of paved highways and 450 million miles of cart-roads (Clarkson, 1961, p. 405). The idea that Imperial Russia was traversed with 470 million miles of macadam and dirt roads is far-fetched. The United States in 1982 only maintained 3.9 million miles of public highways and 560,000 miles of public-highway bridges (Paul, 1982, p. 33).

TABLE 6.2

PAVED AND UNPAVED ROADS AND HIGHWAYS UNDER ADMINISTRATION OF PROVINCES DIRECTED BY THE MINISTRY OF COMMUNICATION AND BY DISTRICT COUNCILS FROM 1902-1912

	LENGTH OF ROADS (including bridges) IN MILES				
	1902	1905	1907	1910	1912
A. ROADS CONTROLLED BY MINISTRY OF COMMUNICATION					
1. Warsaw	2,223.7	2,353.9	2,353.9	2,354.0	2,354.0
2. Vilna	1,569.3	1,678.1	1,678.4	1,677.4	1,580.0
3. Caucasus	2,674.0	2,651.2	2,655.5	2,682.9	2,683.1
4. Kiev	1,382.7	1,318.8	1,343.7	1,344.0	1,344.0
5. Moscow	318.1	121.9	100.4	100.4	100.4
6. St. Petersburg	8,284.1	118.9	118.8	118.9	118.9
TOTAL	16,449.8	8,842.8	8,250.7	8.277.6	8.180.4
B. ROADS CONTROLLED BY DISTRICT COUNCILS (ZEMSTVOS)					
1. Vladimir	217.3	217.4	217.4	217.4	217.4
2. Voronezh	53.5	53.6	53.6	53.0	53.0
3. Kaluga	161.0	161.5	161.5	161.5	161.5
4. Kursk	148.9	149.0	149.0	149.0	149.0
5. Moscow	336.0	336.0	336.0	336.0	336.0
6. Novgorod	379.1	379.3	379.3	379.3	379.3
7. Orel	259.1	259.1	259.1	259.1	259.1
8. Riazan	47.0	47.0	47.0	47.0	47.0
9. St. Petersburg	589.8	590.0	590.0	590.0	590.0
10. Tver	124.2	124.4	124.4	124.4	124.4
11. Tula	189.2	189.2	189.2	189.2	189.2
12. Yaroslavl	2,512.1	55.2	55.2	55.2	55.2
13. Smolensk	----	196.3	196.3	196.3	196.3
14. Chernigov	----	127.8	127.8	127.8	127.8
15. Kharkov	----	-----	21.9	21.9	21.9
16. Mogilev	----	-----	-----	33.5	33.5
17. Pskov	----	-----	-----	-----	97.4
TOTAL	5,017.2	2,885.8	2,907.7	2,941.4	3,038.8
GRAND TOTAL	21,467.0	11,728.6	11,158.4	11,219.0	11,219.2

[1] Statistischeskii Sbornik. Tablitsa X, pp. 2-13, 1902.
[2] Statistischeskii Ezhegodnik Rossii 1907 g., p. 194, 1908.
[3] Statistischeskii Ezhegodnik Rossii 1908 g., p. 330, 1909.
[4] Statistischeskii Ezhegodnik Rossii 1909 g., p. 464, 1910.
[5] Statistischeskii Ezhegodnik Rossii 1910 g., p. 194, 1911.
[6] Statistischeskii Ezhegodnik Rossii 1913 g., p. 37, 1914.

The leadership was so completely absorbed with laying rail lines that highway building was vitually ignored. In the last half of the nineteenth century, for example, few new roads or old ones were paved because of rail expansion (Shchepotev, 1899, p. 355). The Moscow Highway during normal times carried about six million poods (approximately 216 million pounds) of goods per day, but the St. Petersburg-Moscow Railway took away business (Haywood, 1968, p. 218). The suburban roads around the city of Moscow hauled 15 million poods (about 525 million pounds) of provisions daily. This was lowered to about 500,000 poods (approximately 1.5 million pounds) because of rail substitutes (Lyaschenko, 1948, p. 512).

A useful indicator in the remission of public highway construction and use were the toll receipts from state turnpike gates. From 1892-1902, at the height of rail dominance, the tolls that were received declined considerably on the public ways. District roads, on the other hand, did not suffer as severely. In fact, zemstvo controlled highways showed a moderate increase in their roadways. (Table 6.3)

The budget of state and local governments was another weathervane in rail preference. The Ministry of Ways of Communications appropriated twice as much in funds for railway construction than it did for public highways in 1887. In succeeding years, road expenditures were pushed further behind

TABLE 6.3

TOLLS COLLECTED ON HIGHWAYS UNDER CONTROL OF MINISTRY OF WAYS OF COMMUNICATION AND ZEMSTVOS, 1892-1902

DIVISION	VERSTS	TOLL IN RUBLES
A. Ministry of Communication		
1892	4,399	232,413.86
1893	4,298	245,232.40
1894	4,288	252,335.40
1895	4,288	229,803.46
1896		
1897	4,089	214,876.76
1898	4,007	198,315.51
1899	2,933	191,770.89
1900	2,934	172,291.76
1901	2,934	152,055.57
1902	2,934	130,523.53
B. District Councils		
1892	1,149	144,032.94
1893	1,167	159,972.45
1894	1,167	174,319.29
1895	1,167	205,196.23
1896	1,167	213,775.89
1897	1,445	214,850.80
1898	1,248	206,909.15
1899	1,248	195,631.97
1900	1,248	185,910.52
1901	1,248	179,194.62
1902	1,288	164,538.20

SOURCE: Statisticheskii Ezhegodnik Rossii 1913 g. desyati g. Izdanie: Tsentralnago statisticheskago komitet. m.v.d. Tablitsa Xii, p. 7. St. Petersburg, 1914.

iron track laying. In the beginning of the twentieth century, the budget at the state level for rail development was 18 times larger than that providing for hard roads. No satisfaction to highway users, this under-capitalization for better roadways was equal to the expenditure in river communication in 1900. (Table 6.4)

Regarding the zemstvos, their budgets showed that roads also were not a worthy investment. On the average approximately 79,163 rubles (about $40,373.00) were spent by all eleven European Russian provinces where local councils were located in 1886. In Bessarabia, road boards budgeted a mere 100 rubles (about $51.00) for roads, but zero was actually spent. The Samara province councils allocated 31,346 rubles (about $15,986) but used only 24,368 (about $12,479.00). In fact, out of the 34 zemstvos 32 underspent their road fund (S. Ros., 1890, pp. 232-33). The situation did not change by 1895, especially in Transcaucasus, Central Asia, and Siberia where in this immense area the local councils assigned a total of only 398,185 rubles (about $100,014) for their local roads (Shchpotev, 1899, p. 355).[15]

Wherever roads were built, they were not laid out to connect communities as one would expect. Instead, planners were instructed to build highways that paralleled the rail lines.

---

[15]See Appendix E for further information.

TABLE 6.4

BUDGET OF THE MINISTRY OF
WAYS OF COMMUNICATION

DIVISION	IN RUBLES 1887[a]	1899[b]	1900[b]
1. Central Administration	1,662,513	3,022,985	2,991,189
2. Provincial Administration	1,503,187	1,979,277	1,939,129
3. Schools	148,845	276,667	276,667
4. River Communications	4,525,520	12,304,016	12,717,360
5. State Railways	11,980,653	212,421,059	237,169,610
6. State Roads	5,522,865	12,935,150	12,789,578
7. Drivers Expenses	298,606	----	----
8. Commercial Ports	---	4,867,670	6,549,504
9. Railway Improvement	---	43,767,471	46,410,000
10. Expenses due to the budget for 1901	---	500,000	500,000
11. Miscellaneous	---	1,100,588	944,931
Total for Ministry of Ways of Communication	25,642,189	293,174,883	322,287,968

SOURCE: [a]Reports from the Consuls of the United States. No. 93, May, 1888. Washington: Government Printing Office, 1888, p. 343.

[b]"The Russian Budget," Russian Journal of Financial Statistics. Volume 1. 1903, p. 312.

The logic was that if freight or passenger trains were put out of commission, the roadway would serve to keep the communication lines open (Nansen, 1914, p. 388).

Since the majority of Russia's public highways became irrelevant to national economic and social transportation, highway strategists had to rethink the entire organization of the public thoroughfares. The routes that remained under the Department of Roads and Bridges were grouped into two broad but important categories in 1883, a strategy no doubt that made for logical administration: (1) major important state highways and (2) valuable local roads. The highways in the former category included: (a) all roads passing through the territory of Zapadnaya Dvina and Dniepr Rivers, (b) Pskov-Riga Highway, (c) St. Petersburg environ roads, (d) coastal Crimean Peninsula highways, and the Simferopol-Savastopol Highway including the Alushta-Simferopol Highway, (3) Moscow-Brest Litvosk Highway (not including the stretch from Moscow to Roslav), (f) Kiev-Ostrov Highway, and (g) the Viborg Highway (Yanovskii, 1893, p. 55).

In the end, the commercial importance and general travel via Russia's public highways were no match to railway travel. To be sure cartage locomotion continue, but its circle of dominance no longer covered the entire Empire as it once had. Motor transportation was virtually insignificant. Before

World War I, railways moved 45 billion short ton-miles of goods; inland waterways (powered crafts), 17.9; maritime shipping, 13.6; pipeline, 0.2; automobile-truck, 0.07. Regarding weight to distance, railways carried 65.7 billion metric ton-kilometers; inland waterways (powered craft), 28.5; maritime shipping, 19.9; pipeline, 0.3; automobile-truck, 0.1 (Schere, 1978, p. 417).

The extraordinary and striking characteristic of Russia's backward position in public transportation routes shows when compared to other European countries. Prior to 1914, the Russian Empire was last out of eight European countries with only 1.3 miles of public roads per 500 square miles of area. With regard to population, only 67 miles of highways per 500,000 inhabitants were available. France was forty times smaller than Russia but had fifteen times more roadways; Great Britain, seventy times smaller had seven times more highways; Italy, seventy-six times smaller had twice as many roads as Russia. The Empire could only boast that it had more public thoroughfares than tiny Belgium, but Russia was 745 times larger. (Table 6.5)

Conclusions

During the early period of the Russian Empire, transportation was conducted either by river barges or overland in carts and sledges. The leaders spent untold sums on the canalization

TABLE 6.5

COMPARISON OF HIGHWAYS IN EUROPE

BEFORE WORLD WAR I

COUNTRY	Length of Roads in Miles	Density Pop. Per 500 Sq. Miles	Miles of Roads Per 500,000 Inhabitants	Miles of Roads Per 500 Sq. Miles
France.	349,848	94,157.4	4,485.2	844.6
Germany.	164,671	160,479.0	1,228.8	394.4
Great Britain. .	159,078	185,643.5	1,767.5	656.2
Italy	50,955	155,896.9	738.4	230.2
Sweden.	36,041	15,905.1	3,276.4	104.2
Russia.	22,332	9,819.8	67.0	1.3
Norway.	16,467	9,445.3	3,503.6	66.1
Spain	15,535	48,735.9	415.3	40.4
Belgium.	15,224	325,991.1	14.8	670.6

SOURCE: Compiled by author.

of rivers while roads received sporadic and nominal attention. As circumstances changed and the leadership became wiser, a new but temporary direction toward public roads resulted. The Russia of Nicholas I provided the inhabitants with modern year-round highways that no other tsar would surpass. Russia put its full weight and resources into revitalizing its internal land carriage route ways. A significant number of major towns and cities were connected with good hard-surfaced thoroughfares providing all year accessibility, whereas travel before was fraught with environmental obstacles and uncertainties. But off the first class paved roads, rasputitsa was still a major obstacle to uninterrupted travel.

When traveling over the Empire's public highways in the nineteenth century, a traveler would come in contact with a five-tier classification of roads. The Department of Roads and Bridges from time to time deleted from their roles certain thoroughfares for a variety of reasons, upkeep expense the major one.

It was only a matter of time until rail lines would by far overshadow the laying of macadam highways. The economic advantages of rail transportation was undeniable and the role of public roads and cartage was altered considerably. The state roads and zemstvo thoroughfares declined substantially in length and use, as decision makers saw little benefit in

continuing macadamization. Life for most of the inhabitants went back into the mud as the zenith in highway development gave way to common sense transportation, the railroad. The state and private investors concluded that pumping hundreds of millions of rubles into rail transportation facilities was in the best interest of Russia, and that the several million rubles that were budgeted annually for road construction projects were adequate.

CHAPTER VII

PRINCIPLES OF ROAD DESIGN AND HIGHWAY CONSTRUCTION

Introduction

At the end of the Russian Empire in 1917, the road network resembled that of eighteenth century England, an obvious remark that overland routes in Russia were in a primitive state (Dobbs, 1948, p. 25). It is true that good dirt roads and paved highways in the nineteenth and twentieth centuries were pitiful, and to a certain extent this is still a major problem in modern Soviet life and public economy today.

Regardless of the Empire's backward characterization, the roadways, natural or stoned, were planned, funded and built. The large appropriations of labor and resources were the ways for the Tsarist state to overcome certain constraints, the major one being environmental challenges. Before the establishment of railway linkages, the authorities had no other option but to conduct the affairs of government

and commerce by cart and sledge. This required, however, an organization of some magnitude in order to build, maintain, and supervise uninterrupted travel.

At first road construction was simple, but as more and more roads were opened, travel demanded more and more attention from St. Petersburg. The government could no longer take for granted construction, repair, and the general overall regulatory aspects of land transportation. Prior to the macadamization of roadways, the technology was uncomplicated. Most of the labor requirement was free and the road budgets were small. But modern road making necessitated an understanding between science and soil. Bridges, streets, and sidewalks as well took on greater significance as Russia moved into the mainstream of civilization.

The purpose of this chapter is to show the Empire's ability to engineer, construct, and maintain state public highways including highway-bridges, streets, and sidewalks.

Road Engineering Principles

Before stretches were paved, early roads were crude clearings through forest or rough tracks across open country. Scientific principles of road making were unknown in the pre-Petrine period. The roads were repaired with whatever material was on hand. The most frequent of these were sticks, hay, rubble, and animals dung. To cross the

extensive swamps, corduroy roads were laid with rough planks or round logs. On muddy ways, traction was enhanced with cut branches thrown across the ground to make cart-roads passable.

Road engineering varied from regime to regime. In Peter the Great's time, the public roads, before they were widened, were all natural and narrow. The Empire's main wagon-roads were ordered to be three sazhens (about 21 feet) wide, just enough space for two vehicles to pass one another (SIRIO, 1896, p. 554). The law also stipulated that road upkeep was the responsibility of the provincial administrators, but this law was later abandoned after the death of Peter (Yanovskii, 1893, p. 54).

In 1766, Russian road technicians were instructed to lay all highroads to important cities ten sazhens (about seventy feet) broad and another ten sazhens of open space on either side of the carriage-road. Although the back roads were heavily traveled by peasant farmers, they were only three sazhens wide (Semenov, 1859, p. 60).

Russia's public roads and highways were standardized during the nineteenth century. The main roads of communication were no less than sixty sazhens (about 420 feet) wide. Provincial and district roads were thirty sazhens (about 210 feet) across and included wide stretches of cleared land on both sides. The rural cart-roads and bridle-tracks had

no specific dimensions. They were struck out as situations warranted (Soloveva, 1975, p. 54).[1] Despite these spacious avenues, Russian law required all vehicles to drive on the right side of the road. Even the large cattle drives were not allowed to walk willy-nilly. The tenders obeyed the laws as specificed (Schuyler, 1884, vol.1, p. 123).[2]

Reasons for Wide Highways. There were several practical reasons why the Imperial roads were spacious. An important factor was to have enough clearing for traffic when the lanes became rutted or badly beaten. When one side was unusable, another "road" (emphasis added) was started until the old one was repaired or smoothed by natural forces (Murray, 1849, p. 530). In fact, the law stated that on all dirt roads only one-half of the roadway was to be used at one time until

---

[1]The excellent French highways were organized in a four-tier system in the 1880s: (1) First Class--66 feet wide with the middle 22 feet paved; (2) Second Class--52 feet wide, 20 feet in the middle paved; (3) Third Class--33 feet wide with 16 feet paved; (4) Fourth Class--26 feet wide, 16 feet paved (Gillmore, 1888, p. 69).

[2]Soviet highways today are as broad as their predecessor's were. Soviet highways are classed into five categories: (1) First Class--27.7 meters wide (about 90 feet); (2) Second Class--15 meters wide (about 50 feet); (3) Third Class--12 meters (about 40 feet) wide; (4) Fourth Class--10 meters (about 32 feet wide); (5) Fifth Class--8 meters (about 26 feet) wide (TGSE, 1970, p. 67).

the other side was fixed. Until roads were weatherized, this side-to-side method of driving was the pattern (Barry, 1872, p. 196). In the Baku region, for example, where the ground was sandy and loose, rights-of-way were extended beyond the rule specified in the manual of road and bridge construction. It was not unusual for roadways in the southern steppe to be as wide as 500 yards. This was possible in most sections of southern Russia because of boundless flat terrain and only minor obstructions by vegetation (Thompson, 1904, p. 20).

As a rule, road builders preferred a clearance from 70 to 100 yards on either side of the center road. This concept in Russian road construction permitted roads to dry out (Bremmer, 1839, vol. 1, p. 16). Another consideration, and an important one, was for protection from road bandits. Broad clearings gave drivers and passengers an unobstructed view of the road ahead (Lyall, 1825, vol. 1, p. 75). It was important that highway security be planned. Road robbers were very common and they often worked in bands. In the province of Novgorod in 1719 from 100 to 200 highwaymen plundered travelers (Waliszewski, 1897, p. 492).[3]

---

[3]Highway robberies were a major consternation to the authorities. It was impossible to secure the roads because of the distances from place to place. For example, the Minister of Ways of Communications, Rear-Admiral Possiet (1888-1889), argued that the main reason the Siberian highways were susceptible to such large incidences of mischief and murder was because of large number of escaping

There was also another useful aspect of spacious roadways. The state leased out the area from the carriage-road to the forest edge to peasant farmers for growing hay and grazing animals, but plowing the land was forbidden (Stevens, 1891, p. 69). It was fitting when a traveler, commenting on Russian big roads, said, "All roads have length more or less; ours had length, breadth, depth, and thickness." (Knox, 1870, p. 255)

Highway Beautification. The idea of highway beautification depended upon the penchant of the monarchs. Some major public highways were lined along the entire length with trees carefully groomed and on other stretches with thickets or bushes. Road architects and planners objected to trees, hedges, or walls along the roadway because in winter they were easily hidden by snow drifts. Since drivers were inclined to leave the main winter-roads and make their own, any kind of fence was considered dangerous (Rigby, 1842,

---

exiles. Possiet worked hard toward the idea that Siberia must be developed and not made a dumping ground for Russia's unwanted (AAC, 1876, p. 699). Tsarist law dealt harshly with road bandits when a murder was committed. They were hanged on the spot as a reminder to potential criminals. It was the custom to erect wooden markers along the side of the road where travelers were killed. On the Vilna Highway, for example, in western Russia, a marker was raised where thirty travelers were massacred during the 1860s (Korb, 1863, vol. 1, pp. 77, 126).

vol. 1, pp. 172-73). It was a desire, nevertheless, of Alexander I that all important highways be outlined with tall trees on each side (Lyall, 1825, vol. 1, p. 65). Ordinary roads, away from the cities, for the most part were not defined with vegetation or wooden fences as boundaries (Elliot, 1838, vol. a, p. 247).[4]

Macadamization. When the decision was made to pave the Empire's dirt roads in 1817, the popular macadam invention was chosen. As a matter of resource and financial saving, only the major carriage-roads were paved. The Department of Roads and Bridges used the "Norms of Yearly Needs for Crushed Stone" to determine the quantity and quality of material for surfacing (Tannenbaum, 1903, pp. 706-07). Three grades of stone were the bases for weatherizing the roads: (1) coarse stone, 3-5 cubic inches, (2) medium stone, 2-3 cubic inches, and (3) small stone, 1-1/4 to 1-3/4 cubic inches (BE, 1909, p. 351).[5]

---

[4]To lend a sense of attractiveness and shade, treeless roads were often artificially beautified when the tsar traveled. Whenever Nicholas II went on a trip, large full branches were cut and inserted into the ground on both sides of the highway at regular intervals (MacGowan, 1904, p. 672).

[5]To macadamize a road is synonymous with the inventor's name, J. L. MacAdam, which meant to pave the ground with small, broken stone. This revolutionized road making (1816-19). The basic tenet was that strong, small angular stones will compact making the surface smooth, strong, and impervious to water. Repair was required only when dry weather unraveled the surface and potholes resulted (LLA, 1883, p. 253).

On highways that carried heavy traffic, the pavement was comprised of crushed granite from 2-2½ cubic inches, or with 4-5 cubic inches of soft stone. On roads where light wheel traffic prevailed, fine chips of 1¼-1½ cubic inches in size were applied. The rural back roads, if paved at all, were covered with noncrushed gravel.[6] The Department of Roads and Bridges specified that all cart-lanes on the major routes were to be paved from 2½-3 sazhens (about 18-21 feet) across and another 1½ sazhens (about 10½ feet) for the road shoulder. Stone was applied from 5-7 inches (MacAdam recommended 10 inches) thick and pounded into the ground with hand rollers (Tannenbaum, 1903, pp. 796-97). If the crushed rock was not applied correctly, the surface became "putty-like" (emphasis added) and locomotion was particularly difficult for draught animals to pull any loads (Cottrell, 1842, p. 18).[7]

[6]Macadam paving is based upon uniform stone size, preferably a one-inch cube. The broken stone must pass through a two-inch ring before it is considered acceptable. A story goes that broken stone for Roman roads was that for every stone that passed between the teeth of a workman, passed the test for size (Blake, 1902, p. 1023).

[7]It is regarded that modern macadam roads would not have been possible without the invention of the automatic stone-crusher. The world's first rock breaker was invented by an American, Eli Whitney Blake, in 1858. This machine revolutionized modern stone-road construction (TAIME, 1902, p. 991). An expert ranked the best to the least suitable crushed stone for macadam roads: (1) trap, (2) syenite, (3) noncrystalline limestone, (4) chert, (5) granite, (6) mica-schist, and (7) quartzite (Page, 1912, pp. 135, 167).

Macadam stated that the gradient of macadam surfaces should be between 1/30-1/40 for first class highways in order to provide minimum ease of traction for the animals pulling vehicles and heavy loads (TEB, 1911, p. 389). The Russian highroads did not exceed 1/20-1/30 gradient (BE, 1909, p. 351).[8]

The recommended source of good paving stone was difficult to procure because of Russia's geological and glacial background. Where stone was scarce, a widespread problem, road making and repairs were done with artificial "clinkers," made specially for road construction. All of these clinkers were put out from kilns entirely in the Warsaw province during the early twentieth century (GR, 1912, p. 162). Moreover, Russia being destitute of good surfacing rock, the engineers also utilized the tailings from the ore-crushing industries for paving. It was not unusual for roads to be

---

[8]The kinds of pavement to tractive resistance to move loads was significant. Surface smoothness was the major criteria. In regard to dirt-roads, the resistance to traction for one horse on sand-roads was 1/5 or 20% of the weight of the load, or 40 pounds per ton; gravel-road, 1/10 or 10% of the weight of the load, or 200 pounds per ton; earth-road, 1/10 or 10% of the weight of the load, or 200 pounds per ton; macadam road, 1/25-1/35 of the weight of the load, or 40 pounds per ton. To move one ton of material on an asphalt road surface required 1½ horses; common stone blocks, 8 horses; macadam road, from 5-7 horses; on good cobble-road, from 6.6-13.3 horses; on common cobble-road, 25 horses; well-made earth-road or gravel-road, 20 horses; sand-road, 40 horses. The best surface for locomotive ease was on iron rails where only 1½ horses were required to pull one ton of goods (TMB, 1889, p. 272).

surfaced with the ore itself when necessary (TIM, 1911, p. 264). Government road supervisors bought great quantities of tailings from the manganese ore producers (Drake, 1898, p. 204). In the Ural region, the tailings for road paving cost $3.00 per ton (Nitze and Purington, 1898, p. 32).

It was out of the question to use cement or asphalt in road paving. The Russian stock exchange listed only seven companies that engaged in cement and building materials in 1900. By 1916, there were sixty-seven plants capable of making concrete, but by this time weatherizing the roadways was of low priority (TQ, 1916, p. 163).[9]

Macadam Advantages and Disadvantages. The macadam method of paving adopted by the Department of Roads and Bridges had several appealing qualities over other well-known, proven road making procedures. In the first place, the macadam roads were the cheapest to build of all known technologies (Law and Clark, 1914, p. 429). Another reason was that it did not require excavation or much grading. Russian engineers, no doubt, were particularly attracted to macadam roads in their country because the process was primarily concerned with rebuilding old roads rather than building new ones. Also, sand bed was considered

---

[9]The majority of highways in the Soviet Union today are of concrete and asphalt construction, the preference being asphalt (author).

the best possible foundation, a feature that delighted planners since sandy ground was common throughout much of European Russia (TEB, 1911, p. 389).

The macadam surface withstood terrific abuse, but its greatest enemy was water (Bartholomew, 1872, p. 314). To safeguard against Russia's snowy winter and rainy seasons, the cart-road was somewhat higher in the middle for water runoff and drainage ditches were added on either side (Tannenbaum, 1903, pp. 796-97). A major disadvantage were that animals were badly cut and bruised by sharp stones that were kicked up. Since peasants did not believe in shoeing their horses, they avoided stone roadways whenever possible (Kinglake, 1881, vol. 1, p. 264). Moreover, granite-chip surfaces, when wet, caused horses that were being driven at a fast pace to fall and slide (TPSM, 1876-1877, p. 118).

Businessmen complained that company vehicles and goods-carts were routinely damaged on improperly paved macadam highways that in turn caused violent jolting and the subsequently large vehicle repair bills. It was said that for every ten hours of travel, one hour was spent in repair (BEM, 1855, p. 281). Because of this situation, it was recommended that engineers abandon paving with whole-flint and black-granite stones and instead substitute broken-flint rock (Thompson, 1904, p. 20).

Maintenance and Repair. General resurfacing was necessary after two or three years. In some provinces, entire highways were remade or repaved because of frost heaves, soil deterioration, flooding, or normal traffic use (Tannenbaum, 1903, pp. 796-97).

Russia drew the labor to repair the state and local roads from its vast population. Before the macadam period, the ukaze of 1813 differentiated between "free labor" and "hired labor" that were assigned to work on the road crews. It was agreed that only the state highways were to be maintained by workers paid by the government. As a general policy, free labor continued to keep the local roads passable (Semenov, 1859, p. 177). At the zemstvo and zemsky level, the uriadniki, or special police, were formed in 1878 to make a determination of the roads and their safety (Kravchinskii, 1888, p. 130).[10]

The government again used its penal institution to build and repair state highways. The law of 1869, "Working Conditions for Construction Work," outlined the rules for convicts. In different parts of the state and different

---

[10]A special force, the Imperial Militia, built and repaired the military roads. In the 1870s, from 10-15 druschiny (divisions) kept army-roads in passable condition (LLA, 1872, p. 379). Military stretches were planned at the Military Engineering Department after consultation with the Department of Military Topography (LLA, 1896, p. 137).

seasons of the year, the law stated the working day. In the central provinces, for example, road gangs worked a 12-hour day between May and July and a 7-hour day from December through January. Moreover, convict labor was not totally free. The pay was calculated at ten percent of the regular road maker's wages. For example, if road work was valued at one ruble per day, a prisoner received ten kopecks (Chekhov, 1967, pp. 66, 277). Citizens could be arrested or banished to Siberia if accused and convicted of endangering or destroying the Empire's land transportation facilities or equipment. The Criminal Code of 1868 embraced a variety of infractions pertaining to crimes against the physical abuse to roadways, streets, and bridges (TAAC, 1869, p. 682).

In regard to maintenance machinery, the Tsarist state neither produced nor imported much modern equipment. The major reason was that the land in most instances was too soft or too wet for big, heavy machinery to be any good. Maintenance, therefore, was by hand labor as in a bygone era (CR, 1914, p. 940). Crushed stone was heaped at specified distances along the side of the roadway (Tannenbaum, 1903, p. 797). A simple harrow or crude road rake was the standard equipment used to smooth ruts and potholes (Palmer, 1901, p. 124).[11]

---

[11]Today in the USSR more than 46,000 bulldozers, 42,000 excavators, 25,000 road scrapers, road graders, and loaders are manufactured yearly (SW, 1981, p. 4).

Construction and Repair Expenditures. A government report in the early twentieth century estimated that the construction of one verst of macadam highway in Russia ranged from 8,000 to 19,000 rubles (about $4,120-$9,785) during the early 1900s. The annual upkeep was from 90-270 rubles (about $46-$139) per verst, or 10-20 kopecks (about 5-10¢) per square sagene (about 49 square feet). The capital outlay for repairs was 195-365 rubles (about $100-$188) per verst, or 20-30 kopecks (about 10-15¢) per square sagene (USSS, 1913, p. 74). The wide variation of cost and repair was because of the difficulty in procuring adequate building materials and the weather impediments that routinely damaged the highways (GR, 1912, p. 162).[12]

Early in the macadam era, breaking granite boulders and transporting them were the main factors contributing

---

[12] In ancient days, it was figured that Roman roads cost from $30,000-$100,000 per mile to build (Pope, 1898, p. 168). In the United States, in 1843, one mile of macadam road cost about $1,397 (HMM, 1843, p. 483). One mile of Russian railway ranged from $30,000-$40,000 during the 1880s (CR, 1888, p. 349). In comparison to French road making, in 1893, the cost for building macadam roads was $2,35 per square meter, with 5-10¢ for repair per year. To build one kilometer on flat terrain was $6,000; valley-roads, $4,000; mountain-roads, $9,000. The comparative inexpensiveness was because of labor expense. An ordinary road laborer received 58¢ per day; man and horse, $1.55 per day; foreman, $20 per month; supervisor, $600 per year; engineer, $1,000 per year; and chief engineer, $2,000 per year (TMB, 1893, pp. 244-45). In the United States in 1893, the cost of granite paving stone was $3.00 per square yard (TMB, 1893, pp. 279-80).

to the sky-high costs in building and repairing the roads (Cottrell, 1842, p. 193). During the modern period, the railway boom requisitioned most of the stone for ballast of the railbed. For example, road builders in the Kiev, Vilna, and Warsaw provinces were forced to pay 100 rubles (about $51) or more per cubic sazhen (about 12-2/3 cubic yards), a substantial amount of money at that time (GR, 1912, p. 162).

The cost of construction and maintenance varied in other European countries. By comparison, Russia was on the average somewhat more expensive, but when it came to annual maintenance, road upkeep was cheaper than most countries of Europe. (Table 7.1)

Highway-Bridges

Russia's waterways carried the country's products without too much difficulty, but spanning them with bridges was an entirely different matter. In order for highways to be efficient and overland travel unimpeded, the waterways had to be bridged. Crossing great rivers and small streams was no simple feat. Throughout the country were some 120,000 meandering waterways (Zadvony, 1980, p. 20). In a radius of a few miles, anywhere in European Russia,

TABLE 7.1

HIGHWAY CONSTRUCTION AND
MAINTENANCE COST, 1910
(in dollars)

COUNTRY	COST (per mile)	MAINTENANCE (per mile)
Austria	----------	$311
Hungary	----------	282
Denmark	$1,300-8,700	---
England-Wales	----------	389
France	9,000	346
Italy	----------	274.70
Norway	8,000	---
Russia	8,544-10,874	70-210
Spain	----------	230-240
Sweden	----------	60

SOURCE: The American Highway Association, 1914, pp. 13-18.

from five to nine bridges were crossed because of the winding rivers (Pares, 1962, p. 77)[13]

During the middle of the nineteenth century, state bridges were designed and erected by the Department of Roads and Bridges, branch of the Ministry of Ways of Communications (Haxthausen, 1858, vol. 1, p.347). In the areas where zemstvos and zemsky were located, river-spans were the ward of local supervisors with the collaboration of experts from St. Petersburg (Gnusin, 1889, p. 431).

Although the Empire was a metal-producing country, cast-iron spans were rare and located only near large metropolitan areas. The myriad of rivers, lakes, swamps, streams, and rivulets were bridged with wooden spans. Broken structures had to be repaired by drivers and passengers along the way. The government even authorized the floggings of the officials responsible in an effort to maintain bridges and keep communication open. It was normal equipment for carriages to carry two wide planks in order to ford shallow streams (Korb, 1863, vol. 1, pp. 75-76).

As a rule, bridges were built of rough planks held together by upright logs that were bound with cord (Auteroche,

---

[13]The railway between St. Petersburg and Moscow required 200 bridges and 70 aqueducts (Parry, 1939, p. 228). The Trans-Siberian Railway in 1892 had to cross 209 bridges between Samara and Ufa, a distance of only 300 miles (Closterholfen, 1893, p. 449).

1770, p. 87). Some bridge floors were made with unfinished logs laid side by side and covered with gravel or sand (TLD, 1908, p. 59). Even the veteran yemstchiki feared the bridges (Wallace, 1908, p. 13).[14] On the Moscow Highway, small footbridges with iron railings in the center known as "the Imperial Arms" were erected for walking travelers (HMM, 1830, p. 411).

Since the basic material in bridge building was wood, the travelers were prohibited by law from smoking a good distance before and after crossing (Child, 1889, p. 675). Despite this well-intentioned regulation, bridge fires were alarmingly widespread. The frequent burnings no doubt caused the Department of Roads and Bridges during the last half of the nineteenth century to ban all construction of wooden highway-bridges that connected main towns and old wooden ones were to be replaced with iron in due time. Local governments not effected by this ruling continued to erect wooden spans (VNEM, 1871, p. 15).

Other situations caused bridges to weaken or be entirely absent. A major problem in the northern and central provinces was that planks, boards, and even support beams were stolen

---

[14] Russians realized that their bridges were anything but satisfactory and liked to joke about them. A typical uncomplimentary story in 1896 went as follows:

> A gentleman, on a drive in the country, comes to a rude rustic bridge over a stream. It collapses beneath his carriage. His comment is: "The fool! He saw it was a bridge, and he tried to go over it." (Pares, 1961, pp. 33-34).

for firewood by the peasant (Bigelow, 1893, p. 251). Inhabitants in war zones, especially in western Russia, remained bridgeless until hostilities ceased before reestablishing overland routes (Choiseul-Gouffier, 1904, pp. 96, 203).

Wood structures were often damaged or ruined during the winter when ice set in and then again in the spring by floods (CAM, 1801, p. 228). One of the most difficult times to cross the rivers was when the waterways were not yet frozen. Where floating-bridges were used, a channel was kept open as long as possible by scores of peasants above and below stream breaking up the ice. Once frozen, the rivers became natural bridges (Korb, 1863, vol. 1, p. 73).

To overcome winter and spring problems, floating-spans were placed over small boats anchored in the water. With the approach of frost or high water, the causeway was dismantled and then reassembled as needed (Brown, 1885, p. 102). If pontoon supports were made with logs, replacement was necessary every ten years. Floating-bridges were also movable to allow ships and debris to pass (Agthe, 1895, p. 427).

Instead of squandering resources on highway-bridges used only in the summer, ferries were the most popular way to cross the streams. Water bodies that separated main highways had elaborate mechanical techniques for crossing. On

less traveled routes, river passage was less complicated but done with some risk involved. A crude raft of logs or planks was pulled across with ropes by animals or humans (Kotzebue, 1802, vol. 2, p. 38). For the most part, ferries were small and carried one equipage at a time. This caused long waiting lines at one end. The Imperial Post did not have to wait since they were priority vehicles. Fording shallow streams presented many annoyances, but deep and wide waterways were an ordeal. Many hours and days were wasted, not to mention the lives lost because of drowning (Korb, 1863, vol. 1, pp. 73-74).

No place in the Russian Empire required more waterway spans than St. Petersburg proper and its environs. The capital site sprawled over more than two dozen large and small islands in the Neva River delta (DeSegur, 1829, p. 313). In the beginning of the development of the capital, construction of bridges was not allowed. In 1720, getting about St. Petersburg from island to island was done with rope-walks (Macpherson, 1805, vol. 2, p. 727). This was a deliberate policy intended to teach the city residents how to be sailors. As a consequence, the geographical spread of the city expanded southward on the mainland, where all main cart-roads emanated (Erman, 1848, vol. 1, p. 35).[15]

[15]Modern Leningrad is spreadout over some 44 islands. About 60 waterways cross the city. There are 376 bridges,

By the early 1820s, the capital contained a total of 156 bridges; 120 were wooden, 29 were granite and 7 were cast iron (Wilson, 1828, vol. 1, p. 221). Moscow and vicinity were not dependent upon many highway-bridges because rivers were few. Nevertheless, in the first decade of the nineteenth century, greater Moscow was reached with 98 wooden spans and 8 stone structures (Cochrane, 1825, vol. 2, p. 254).[16]

The carriage-roads on early bridges were generally one lane, but as overland transportation increased and cities expanded, new spans and remodeled old ones had wide roadways and walks. In 1895, the floor across the floating-bridge over the Duna River at Riga was 35.4 feet wide with two walkways 5.3 feet in width (Agthe, 1895, p. 427). St.

---

21 are drawbridges. The inhabitants of Leningrad, like those of St. Petersburg, are temporarily isolated from one another everyday. From two until four in the morning, all drawbridges remain in an upright position to permit ship passage. The structures are not continually raised or lowered, as in Chicago, where motor vehicle congestion results. In 1981, this practice was avoided in Leningrad during business hours (author).

[16]It is true that Tsardom was known for splendid Bridges, but iron works of this nature were imported. The Russian bridge industry was dominated by the French, British, Germans, and Belgians (VNEW, 1871, p. 17). The legal city of Moscow in 1981 was served with twenty-five bridges. The LeFort Bridge, built in 1700, is the oldest span still traversed by travelers (author).

Petersburg, being larger than Riga, had considerably larger land-water spans. A granite-steel structure across the Neva River in 1904 had a vehicle road 57.9 feet across and two footwalks 9.7 feet wide (Bodin, 1904, p. 396).

Introduced by Peter the Great as a money-raising venture, many highway-bridges required a passage fee (Schuyler, 1884, vol. 2, p. 138). From 1875-76, Russian Poland maintained a total of twenty-seven toll-spans and collected a total of 72,914 rubles (about $36,186) (SS, 1878, pp. 10-13). Not all tolls were uniform but they did reflect regional and local situations. The district Chiefs of Roads and Waterways Communication were obliged to treat government vehicles and military personnel differently from ordinary travelers. Special exemptions were also permitted to institutions of humane and religious significance. For example, the administration in the district of Warsaw, allowed 24 categories of nonpaying customers over the highway span at the village of Vierzbic on the Narew River. The traffic that crossed at the town of Plotzk had only five classes of free passage: (1) postal carts, (2) military conveyances, (3) government vehicles, (4) carts carrying forage back and forth, and (5) members of the hospital staff at Plotzk. Because the structure over the Vistula River at Plotzk was permanent, there was both a summer and a winter toll. The tariff in

winter was doubled to compensate for ice damage, snow removal, and general winter maintenance. (Table 7.2)

Boulevards, Streets, and Sidewalks

In no part of the Russian provinces was the character of civilization so distinctly noticeable than that evidenced by the streets and avenues. Most of the principal cities with their thoroughfares and walks were imposing creations. The general appearance was not as confusing and complicated as the streets in many other European cities. In Russia, the width, length, and straightness were the main characteristics.

Before the reign of Catherine II, most city streets were not built according to any standard plan. It took the burning of the city of Tver in 1763 to change the entire plan of Tsarist streets. The Tsarina assigned to Prince Ivan Betskoy, Director of Commission on Building, to investigate why city fires were prevalent in Russia. Because of this study, it was concluded that fire hazards were incidences that occurred due to wooden structures that were built along narrow streets. Hence, it was ordered that all major cities and their main streets be standardized. The basic plan adopted was along the lines of classical Roman cities, the predominant center square, from which radiated all major and minor streets. In small towns, streets were also straight and parallel on the order of a grid. The width of streets

TABLE 7.2

BRIDGE PASSAGE TARIFF OVER THE RIVER VISTULA AT PLOTSK, RUSSIAN POLAND, 1911

Bridge passage tax during any time, and transport tax from May 1 to November 1.

		Kopecks
a.	A pedestrian	1
b.	A horse, harnessed or unharnessed, and horned cattle	8
c.	Sheep, goat, or swine, per head	1
d.	Unloaded cart	3
e.	Cart (loaded) and carriages	6
f.	Passenger cab	15

Transport tax from November 1 to May 1.*

a.	A pedestrian	2
b.	A horse, harnessed or unharnessed, and horned cattle	6
c.	Sheep, goat, or swine, per head	2
d.	Unloaded cart	3
e.	Cart (loaded) and carriages	12
f.	Passenger cab.	30

*The tariff was raised by one-half of the above if large quantities of ice were in the river.

SOURCE: National Waterways Commission, Document No. 22. Railway Rates, Inland Waterways and Canals in the Russian Empire. Washington: Government Printing Office, 1911, p. 81.

were ordered to be 75 feet wide in a belief that the risk of fire would be reduced (Cronin, 1978, p. 164).

Street Pavement and Maintenance. Over the years, street engineers experimented with a variety of paving material such as granite chips and slabs, cobbles, asphalt, wood, and iron. For the most part, these proved to be unreliable because of environmental factors. The exception was wood, logs and planks resisted frost better than any known building supplies at that time (VNEW, 1872, p. 415).

Wood paving had general acceptance throughout Russia, but in modern times, stone was preferred for surfacing streets. This does not mean, however, that logs, boards, and beams were entirely abandoned in paving. The change to stone was gradual, and only large towns moved to improve urban thoroughfares with the wood substitute. The Russian tradition of providing "goloshes" in special stands at important buildings and private homes was still known to exist in 1910 (Hubbock, 1915, p. 91).

The acquisiton of acceptable building stone was always difficult to obtain in large quantities. Tsars made unusual demands from the inhabitants to provide rock to surface the municipal roads and walks. When the capital was moved from Moscow to St. Petersburg, Tsar Peter ordered in 1717 that the main avenues and important access roads be paved with

stone (Louis and Louis, 1976, p. 162). A ukaze required all large ships entering the harbor to carry thirty boulders; small ships, ten boulders; carts and sledges, no less than three boulders. In this manner architects were given the resources to weatherize important streets and sidewalks including bridges (Lawrence, 1868-69, p. 628).

Russia's main supply of rock primarily came, at an extraordinary cost, from the coast of Finland and the far northern Karelian territory (VNEW, 1871, p. 415). The belief that the capital should be built with stone did not end with Peter. In 1762 the impetus to continue paving with rock was clarified with the formation of the Stone Commission of St. Petersburg (Doroshinskaya and Kruchina-Bogdanov, 1979, p. 149).

Before municipal departments were organized to manage public city property, the general upkeep was the responsibility of the residents. The townspeople employed butschniki or "axemen." They were the guardians of the street. Minor patching, sweeping, and snow removal were in their care (HMM, 1855, p. 442). The butschnik lived in small huts at one end of every main street. Retired soldiers were usually employed (Haxthausen, 1856, vol. 1, pp. 58-59). In southern Russia, paroled convicts became butschniki

(Haxthausen, 1856, vol. 2, p. 145).[17] In the closing years of the nineteenth century, St. Petersburg hired women street sweepers that dressed in red blouses and white aprons (Hapgood, 1895, p. 46).

The cause and effect of mapping out wide boulevards and avenues caused Russians to ride more and walk less. The distances between two parts of town were enormous. Moscow in 1812 was more than 40 versts (about 26.4 miles) in circumference (NWR, 1812-1813, p. 255). The result was that equipage of every description and in large numbers plied city streets and outlying roads (Childs, 1889, p. 602). It was against the law to drive at a full gallop (Schuyler, 1884, vol. 1, p. 123). It was also prohibited for carriages and carts to stop in the middle of the avenue. All vehicles had to roll along at the minimum of a walk (Knox, 1874-75, p. 267). Careless drivers were flogged, and the horses of both parties were confiscated when a street collision occurred (Golovine, 1846, vol. 1, pp. 78-79).[18] Serious

---

[17] A companion to the butschniki were dvorniki. They were entrusted with outside duties but did not have authority of an entire block.

[18] The speed limit for motor vehicles in Soviet cities today is 60 km (about 40 miles) per hour and 80 km (about 50 miles) per hour on main highways. The relatively high rate of speed for city driving is perhaps because of the long, straight avenues and distances from traffic light to traffic light (author).

injury or death sent the guilty driver immediately into the army, and the subject's horses were given to the city fire brigade for non-injury accidents (Haxthausen, 1856, vol. 1, p. 62). To reduce collision, the law in the 1880s did not allow conveyances in town with bells because pedestrians and coachmen would not hear each other (Knox, 1887, pp. 196-97).

The most serious aspect of unpaved streets and dirt sidewalks was dust. The resultant mud became intolerable when it rained. The avenues were transformed into a sea of deep mud (Korb, 1863, vol. 1, p. 72). Poor drainage was a major criticism of Russian street engineering (LLA, 1848, p. 419). Whether prolonged drizzle or short downpour, the crude side ditches, if any, were not able to handle water runoff. The conversion of silt and dirt into ooze caused drownings to occur. Not one or two isolated incidents, but scores of young and old travelers including horses were swallowed in the muck (Lanin, 1892, p. 316).

If traveling across town was necessary, eight or more horses were standard (Haxthausen, 1856, vol. 1, p. 398). If it had rained several days, nothing moved until the streets were completely dried (Korb, 1863, vol. 2, p. 7). On top of that was the vile problem of animal droppings on the roadway. The stench was unbearable in both summer and

winter (Tolstoi, 1932, p. 251).[19] Such conditions were perfect for the spawning of cholera and other illnesses, which killed thousands upon thousands of people every year (Lanin, 1892, pp. 304-18). The fact that dung was used in street repair in southern Russia did not help matters in alleviating unsanitary street conditions (Haxthausen, 1858, vol. 2, p. 398). For example, in Kiev in 1879, the death rate reached 30 per 1,000 inhabitants (because of the terrible drainage facilities (Abramson, 1885, p. 47.)[20]

The Empire's urban streets were somewhat standardized from 50 to 100 feet across. They were grouped into three classes: (1) First Class or Prospekt; (2) Second Class or Ulitza; and (3) Third Class or Pereulk (Baedeker, 1914, p. 101).[21] Streets in Siberia during the 1890s

---

[19] It was common for peasant farmers and herdsmen to bring large and small herds of animals into town without any restrction (Chekhov, 1967, p. 77).

[20] Sewage treatment plants in most Russian towns were unknown. The carting of "nightsoil" to the suburbs for disposal provided thousands of jobs. This subjects is discussed in another chapter.

[21] In the first quarter of the nineteenth century, St. Petersburg maintained 703 streets of all classes (Cochrane, 1825, vol. 1, p. 254). By 1840, about 400 versts (approximately 265 miles) of paved and dirt avenues criss-crossed the capital (Kohl, 1844, vol. 2, p. 37). Moscow in the early 1820s, accounted for 400 streets, but most of them were unpaved (Wilson, 1828, vol. 1, p. 221). In the beginning of 1981, Leningrad had over 2,000 miles of city streets (author).

were called slobodkas, an ancient Russian term (Chekhov, 1967, p. 48.)[22]

Workers Employed in Road, Bridge, and Street Building

The Census of 1897 divided laborers engaged in land transportation construction into two categories--workers that were employed to build public highways, bridges, and streets and laborers to maintain the same. In both instances, the labor pool was appalling small.

The Empire showed a total of 1,332 wage earners in highway construction and 1,410 in repair work. In European Russia (excluding Russian Poland), the average among 13 geographical regions was 97 road workers employed as highway builders and an average of only 12 employees in Poland, Transcaucasus, and Siberia. As a nation, the mean was only 70 workers per geographical region. Regarding maintenance, the situation was about the same. In Russia proper, the average per region was 96 full-time laborers, who maintained the nation's highways and 74 as a country. With employment figures such as these, it's no wonder that the Russian roadways were not in the best condition. (Table 7.3)

---

[22]Russian street names came from their development. For example, names such as Kirpichnaya (kirpich, brick), Pisarskaya (pisar, clerk), Soldatskaya (soldat, soldier), are easily understood. If an official's name is Ivan Petrovich Kuznetzov, then one street will be named Kuznetsova Street, another Ivanova Street, and a third, Ivanovo-Petrovska Street (Chekhov, 1967, pp. 48, 52).

TABLE 7.3

WORKERS IN CONSTRUCTION AND MAINTENANCE OF HIGHWAYS, PAVED AND UNPAVED ROADS, STREETS, AND BRIDGES BY GEOGRAPHICAL REGION, 1897

GEOGRAPHICAL REGION	WORKERS IN BUILDING-REPAIRING HIGHWAYS, EARTH ROADS, STREETS, AND BRIDGES				MAINTENANCE WORKERS OF ROADS, STREETS, AND BRIDGES			
	WAGE EARNER		MEMBER OF HOUSEHOLD		WAGE EARNER		MEMBER OF HOUSEHOLD	
	M	F	M	F	M	F	M	F
1. Agricultural	142	---	92	2	36	---	13	---
2. Middle Volga	90	---	102	---	29	---	7	---
3. Lower Volga	2	---	---	---	88	---	---	---
4. New Russia	10	---	---	---	36	---	15	---
5. Southwest	64	---	13	---	24	---	7	1
6. Little Russia	4	---	2	---	5	---	1	---
7. Industrial	426	---	371	2	214	2	184	1
8. White	255	---	305	---	24	---	35	---
9. Lithuania	21	---	6	18	19	---	30	---
10. Lake	115	---	63	5	222	---	246	1
11. Ural	21	---	5	---	522	---	26	---
12. Baltic	10	---	1	---	8	---	4	---
13. North	102	---	102	---	17	---	5	---
TOTAL European Russia	1,262	---	1,062	27	1,244	2	473	3
14. Russian Poland	37	---	11	1	142	1	18	---
15. Transcaucasus	22	---	3	---	15	---	13	1
16. Central Asia	3	---	---	---	3	---	1	---
17. West Siberia	3	---	---	---	6	---	2	---
18. East Siberia	5	---	1	---	---	---	---	---
19. Far East	---	---	---	---	---	---	---	---
TOTAL Imperial Russia	1,332	---	1,077	28	1,410	3	507	4

SOURCE: Tsentralnyi statisticheskii komitet. Pervaia vseobshchaia perepis~naseleniia Rossikii Imperii 1897 g. Volumes 1-89. St. Petersburg, 1899-1904.

In 1897, the Ministry of Ways of Communications supervised 5,470 miles (excluding Russian Poland) of public highways in European Russia (SS, 1897, p. 34). Using the labor statistics for 1897, the ratio of workers per mile constructed was 1:4.2. The ratio of maintenance workers per mile built was 1:4.3. It was previously pointed out that the state utilized the army and penal system to build public works, thereby reducing the need for a large, permanent work force. Moreover, the system that permitted the peasants to perform road duty in lieu of partial payment of their state taxes was another large source of highway personnel.[23]

It was simply a matter of time before the central government relinquished control of planning all the Empire's highways, bridges, city streets, and so forth. In 1870, St. Petersburg transferred all authority, regarding public works projects, to the large cities. The municipal dumas were given sole responsibility to plan, fund, and implement city streets, sidewalks, local bridges, and so on (Owen, 1981, p. 76).

Conclusions

As the Russian state entered the mainstream of civilization, the cross-country public highways, bridges, streets,

---

[23] See Appendix F for additional information.

and sidewalks were not cause celebre. The state, being the facilitator of land transportation, tried to assure travelers that no part of the country was unreachable despite the overwhelming spatial and environmental obstacles. With enormous expense, the state was able to connect major cities with weatherized roads. The consideration required that capital, labor, and resources be utilized wisely.

Despite tough physical obstacles, the Ministry of Ways of Communications, Department of Roads and Bridges, adopted and encouraged roadmaking in accordance with modern scientific principles of the nineteenth century. Most of the Empire's major highways were made from macadam, the invention that engineers thought best suited Russia's special and unique problems. Unfortunately, well-made roads were few. The construction of a single verst of macadam road was sky high. Contributing to the costs were the lack of adequate local paving rock and the extensive stretches that had to be paved. Nevertheless, natural rock and artificial bricks were crushed, graded, and applied to the ground.

Whether dirt or stone, all of the Empire's public highroads were categorized according to their importance. All had specific dimensions. The thoroughfares were engineered to be big and broad, a design of necessity because of the preponderance of dirt-roads. When one side was impassable, another road was started, and then another,

and so forth. In this manner, locomotion was at least uninterrupted except for the usual delays associated with bare earth pavement.

The streets and sidewalks were covered with granite or wood, but the majority remained natural until situations warranted that they be paved. Street designs, like Russian highways, were also spacious and grand. Strong bridges were only built near the large urban centers, whereas in the interior, good permanent standing structures were rare. Only at strategic river junctions could travelers count on some type of water-crossing facility to be available. For the most part, vehicles had to ford streams the best they could.

The labor force to build and repair the roads and bridges was shameful. There were not enough men and women employed, a condition that compounded travel difficulties. Even with minimal manpower, the Russian state was not as ignorant or backward in road building as one would expect. Instead, road design, engineering, and technical aspects were all brought together in road manuals in order to build weatherized roads and highways that were practical to the nation. There were too many uncontrollable physical impediments that forced Russia to be prudent about their land routes, a situation that many may have misunderstood.

CHAPTER VIII

THE CARTING INDUSTRY

Introduction

Before emancipation of the serfs in 1862, peasants were required to perform a variety of obligatory drayage services for landowners without compensation. It is fair to say that every able male peasant was at some time a vozchik or carter. The work was hard and time-consuming whether in trade or for personal reasons.

After independence, thousands of serfs became employed as full- and part-time teamsters throughout the Empire in the perevozka tovarov vodnm pootem (carrying-trade). Despite modern transportation technology, land carriage by animal-drawn conveyances was neither replaced nor outmoded. On the contrary, cartage demanded the work of great numbers of people to deliver provisions and cargo to all parts of the Empire.

The following chapter looks at the features that describe general carting in the economic development of Russian society. To a large degree, the analysis concentrates on data from

the Census of 1897, the first detailed statistical inventory of the Russian Empire.

Technical Aspects of Land Carriage

Considering the poor roads, small vehicles, great distances, and weather conditions, general carting was a basic and necessary system of distribution in Tsardom. On top of that, it was said that Russia maintained the most complex land carriage and distribution rules and regulations in the world (Parry, 1939, p. 226). Nonetheless, adverse situations rarely discouraged teamsters from carrying grain or wares for hundreds of miles.

Other than the strict government laws and environmental barriers, the major complaint was that the freight trains were slow. In winter the locomotion was somewhat faster, but summer traction was cumbersome at best. On good summer-roads, drivers were fortunate to attain two miles per hour in two-wheeled cart caravans (Freshfield, 1895, p. 109). On muddy thoroughfares only one mile per hour was the norm (DBR, 1861, p. 624).

Traveling traders and cart drivers were well aware of the problems that confronted them on the road. Extended journeys took their toll among the drivers, especially in winter as sub-zero weather sidelined drivers with the various winter-time illnesses. A unique way for the wagoneers to

to keep warm while on the road was for them to carry in their laps a chunk of frozen earth with a small fire usually made of pine cones (Haxthausen, 1856, vol. 1, p. 68).

Merchants expected large profits because the risk was great. They had to bear all the financial losses if problems occurred in transit (Brandt, 1834, p. 1). Whether long or short, the journeys took their toll upon the wooden conveyances that were susceptible to damage by excessive jolting. In order to reduce loss of revenue due to vehicle breakdown or abandonment, convoys always carried blacksmiths and wheelwrights. Also included was a large, but necessary, supply of spare wooden wheels and tools (Stephens, 1844, vol. 1, p. 19).

The legions of freight caravans were not permitted to travel over highways of their own choosing. All convoys were required to obey regulations and follow the so-called "legal routes" (Foust, 1969, p. 99). The routes were designated ways for the cargo-laden telegi and sani, which were closely supervised by state, zemstvos, and zemskys authorities. The purpose was to check all movement and to collect custom fees (Chancery, 1869, p. 105).

In many cases, the legal routes were not the shortest, and in other situations they were punitive measures imposed by the state. Prior to 1715, for example, all convoys in southern Russia first had to drive to the city of Hlukhiv

to have their cargo manifest registered and inspected by custom agents before leaving for their destination. After 1722, all oboz were ordered to travel first to Kiev to get a transport license and then to Briansk, far to the northeast, where conveyances were inspected before customers could receive their merchandise (Chorovsky, 1963, pp. 352-53). Furthermore, Russian law forced merchants to observe closely the carter tenure and travel documents. All drivers under contract had to purchase a license to travel, a permit that was only valid for one year at a time (Clark, 1842, p. 40).[1]

Taxes, Tolls, and Tariffs. At key check stations at the frontier and along legal roads, agents collected ziaket (custom duties) from all merchants (Burnaby, 1878, p. 399). In the last half of the eighteenth century, the duty was fixed at ten percent of the consignment's value (Lipski, 1953, p. 137). At Kiatka, near the border of China in Siberia, 550,000 rubles were collected annually during the late 1700s (Tooke, 1801, vol. 1, p.234). From 1816 to 1861, licensed merchants paid the state treasury a five percent

---

[1]Civilian travelers were pushed to complete a day's journey in order not to violate Russia's curfew law. In the early 1900s, for example, the entrance gates at cities and towns were closed at 10:30 p.m. Travelers found on the road after the warning bell sounded were open to arrest (Kennan, 1910, p. 456).

tax on goods to cover road construction since they were major users of the public trade-roads (Yanovskii, 1893, p. 55).[2]

In theory, highway tolls collected from commercial and passenger conveyances went back into the state and zemstvo road budgets. The public toll-roads in the Moscow province were some of the most traveled in Russia. From 1875-1876, the nineteen Moscow government gates amassed 122,670 rubles (about $62,562) and 128,480 rubles (about $65,525) respectively. The Khimskaya Gate on the Moscow Highway; Pankovskaya Gate, Riazan Highway; Poldolskaya Gate, Warsaw Highway; and Gorenskaya Gate, Nizhnegorodsky Highway were heavily used. (Table 8.1)

From 1888-1893, carters and carriers paid 4,285,657 rubles (about $2,106,113) to pass through gates managed by local settlements. In the six-year period, teamsters paid three times as much in tolls as did passenger vehicles in European Russia. In Siberia and Central Asia, the Trans-Siberian Railway reduced cartage service to a trickle.

---

[2]The tradition of a road tax is still preserved in the Soviet Union and is paid by foreign tourists. In 1980, a fixed road tax must be paid at the border to Sovinteravto-servis agents at the following rates: passenger autos, ten rubles; trailers, 5; buses with forty seats or less, 40; buses with 50 seats or more, 50 rubles. There are seventeen countries exempt from the road tax, most of them socialist states (Zadvorny, 1980, p. 307).

TABLE 8.1

HIGHWAY PASSAGE TAXES COLLECTED IN MOSCOW GUBERNIIA
BY DISTRICT ZEMSTVA FOR 1875 AND 1876

(in rubles)

Gate	Highway	1875	1876
1. Khimskaya	Moscow	19,019.48	15,622.08
2. Vsesvyatskaya	"	6,643.46	11,098.80
3. Klinskaya	"	---------	2,440.29
4. Tushinskaya	Ilnnskoy	10,658.49	9,541.20
5. Danilovskaya	Warsaw	15,142.76	12,165.285
6. Podolskaya	"	12,609.59	10,920.49
7. Krestetskaya	"	---------	1,478.56
8. Podolskaya	Serpukhovsky	2,538.96	3,166.965
9. Lopasninskaya	"	3,057.665	3,092.495
10. Mytishenskaya	Yaroslavl	11,523.67	9,431.37
11. Rostokinskaya	"	---------	2,528.15
12. Troitsko-Sergeivskaya	"	5,531.975	4,577.585
13. Rakhmanovskaya	"	---------	1,879.82
14. Khokhlovskaya	Riazan	4,821.82	6,482.36
15. Pankovskaya	"	16,062.29	14,404.025
16. Bronnotskaya	"	--------	2,699.045
17. Gorenskaya	Nizhnegorodsky	15,060.185	12,112.34
18. Domozhirovskaya	"	--------	2,528.825
19. Zverintsevskaya	"	--------	2,310.375
TOTAL		122,670.35	128,480.08

SOURCE: Statisticheskiy Sbornik. Ministerstva Putei Soobshcheniia. vypusk vtoroi. O Zheleznykh, Vodyanykh i Shosseinykh Putei Soobshcheniia za 1875 8 1876 gg. Izdanie ministerstva putei soobshcheniia. Shosseinye i Mostovy Sbor. Tablitza XVI, pp. 6-7. St. Petersburg, 1878.

Siberian and Central Asian toll-roads between main towns were not as important as before, but convoys were still carrying goods and produce to key trade communities. It is interesting to note that traveling from village to village was still important in Siberia. No doubt these places were away from the railway line. (Table 8.2)

Organization Structure. Teamsters frequently organized into artels or cooperatives (Drage, 1904, p. 185). Wagon drivers, porters, and stevedores formed small associations of ten to fifty members.[3] They normally lived together, shared a common kitchen, and paid a small fee to an elder who managed their business affairs. Because they were seasoned and skilled workers, private contractors preferred artel carriers to independent carters (Kropotkine, 1911, pp. 887-88).

The carriage artels were not permanent, but existed only for the duration of the contract between teamsters and client. Moreover, it was possible for truckers or porters to belong to several similar artels, or different ones for

---

[3] Artels were popular in most aspects of trade and industry. Road builders, bridge builders, street pavers, and so forth had their unions. About 100,000 artels were registered in Russia in 1913 (Lyde, 1926, p. 434). Even Gregory Rasputin was first a carter and a member of an artel before he moved into high society (Dillon, 1918, p. 197).

TABLE 8.2

ROAD TAXES COLLECTED BY LOCAL MUNICIPALITIES,
1888-1893* (excluding Russian Poland)

REGION AND YEAR	TOLLS IN RUBLES		
	Villages	Villages	Towns
	Horse and Carriage	Horse and Carriage	Carters and Carriers
European Russia			
1888	249,082	483,555	556,954
1889	256,480	442,278	664,067
1890	253,535	510,228	725,282
1891	233,453	476,926	737,813
1892	233,734	415,308	659,339
1893	238,398	526,458	759,940
TOTAL	1,464,682	2,854,753	4,103,395
Siberia			
1888	975	53,046	31,885
1889	1,102	48,340	22,258
1890	987	45,139	23,630
1891	1,226	53,304	26,493
1892	821	75,349	31,260
1893	875	75,407	26,851
TOTAL	5,986	350,585	162,377
Central Asia			
1888	-----	2,355	3,160
1889	-----	2,148	2,508
1890	687	2,834	3,876
1891	475	3,213	3,739
1892	334	4,045	3,398
1893	202	3,940	3,204
TOTAL	1,698	18,535	19,885
GRAND TOTAL	1,472,366	3,223,873	4,285,657

SOURCE: Statistika Rossiiskoi Imperii. Sbornik Svedenii Po Rossii 1896. Volume XL. Tablitsa CXXXVI, p. 318. Tsentralnii statisticheskii komitet Ministervsta vnutrennikh del. St. Petersburg, 1897.

*Includes waterway passage but no breakdown is given.

that matter (Kennan, 1915, p. 682). Carters who belonged to the grain carriers association in southern Russia were called drogali. In northern Russia, teamsters at the docks and railway stations were known as kriulchniki or hooks. At the corn wharf in the Koloshinov district of St. Petersburg, more than 500 "hookers" conducted approximately 100,000 rubles (about $51,500) worth of business for their artel during the 1890s (TBCL, 1893-94, pp. 58-59). An important feature about carrier artels, in addition to job protection, regular steady wages, and arbitration rights, was that horseless and cartless peasants could rent equipage for either personal carting or to earn extra money. This practice was widespread in southern Russia where large numbers of rural peasants were without horses and carts (TBCL, 1893-94, p. 58).

The wages of teamsters were determined by hourly employment, room and board, and profits of the respective artels. In 1881, wagon drivers in the Moscow province earned from seven to twelve rubles (about $4.00 to $6.00) per month including board and fifteen to eighteen rubles (about $8.00 to $9.00) without board. Women teamsters in the Riazan government received from sixty-three kopecks to one ruble per day (Hourwich, 1892-93, p. 180). Truckers, after expenses, who rented their equipment, could earn from seventy-five kopecks to 1½ rubles daily, while owners of their carts and horses were earning from 2 to 2½ rubles (about $1.00 to $1.30)

per day during the early 1900s (Rubinow, 1907, p. 535). Additional wages of the specialized carriers are shown in Table 8.3.

In spite of the hard work and long hours, carters were poorly paid in comparison to other workers. Being the lowest class in Russian society, teamster occupations were called tchorni rabochi (black work), labor that was avoided by the better educated people (Rubinow, 1907, p. 532). Since their work was grimy and dirty, as a class of people they were also referred to as tchorni narod (black people) or "dirty folks" (HMM, 1853-54, p. 802). After all, who else would haul Moscow's garbage. The carters hauled the rubbish ten miles from Moscow for disposal (Pares, 1962, p. 332).

Spatial Distribution of Carters

In 1897 there were 334,518 carters as wage earners in eighty-nine guberniias. Every province and every region contained thousands of professional trucks. In European Russia, north of the Black-Earth region, seven geographical regions accounted for twenty-four provinces with 149,444 truckers. The largest and perhaps the most significant was the Industrial Center where more than 51,000 general carters helped supply regional customers. Moscow guberniia contained more drayage workers than any other province in the Empire. Ninety percent of the land carriers in the Lake Region were

TABLE 8.3

WAGES OF OCCUPATIONS RELATED TO CARRIAGE EMPLOYMENT, 1844-1896

	Occupation	Date	Week	High/Low Wages (in dollars)
1.	Cabdrivers	1884	a	.20 - .60[b]
2.	Carriage Drivers	1884	a	.06 - .095[c]
3.	Drayage	1884	72	.18 - .26[c]
4.	Drivers of Coal Carts	1884	a	.55 - 1.60[b]
5.	Drivers of Horse Trams	1884	a	.20 - .86[b]
6.	Drivers of Street Cars	1884	60-126	.32 - .86[b]
7.	Drivers of Cotton Wagons	1884	a	--- - 6.44[d]
8.	Porters	1884	a	.53 - 1.18[b]
9.	Teamsters	1860	a	.20 - .21[b]
	"	1869	a	.25 - ---[b]
	"	1884	60-72	.16 - .60[b]
	"	1896	a	.39 - ---[b]

SOURCE: Compiled from the Fifteenth Annual Report of the Commissioner of Labor, 1900, Volume 2. Washington: Government Printing Office, 1900.

[a]no data given
[b]without board
[c]with board and lodging
[d]per month

concentrated entirely in the St. Petersburg government. The low population density of Novgorod, Olonets, and Pskov provinces did not demand large numbers of carriers. The Far North, being sparsely inhabited, required few wagoneers, but cartage was available at any time from the rural population who wanted to earn extra income.

South of the non-Black Earth area, the grain regions in southern Russia were characterized by a remarkable concentration of wage earners as carters. The provinces of Kherson, Tavrida, and Don especially standout. It was expected that these administrations required large contingencies of truckers since they all bordered the Black Sea and Azov Sea where Russia's major ports were located. Ports of Odessa, Kherson, and Taganrod were large centers for incoming and out-going teamsters. In the 1830s about 6,000 grain-laden wagons and carts entered Taganrod every summer from the interior (Murray, 1840, p. 170). The region of New Russia had a concentration of truckers almost twice as great as all of the other five regions in the south. This was perhaps because agriculture was the only important industry, and perishables had to be carted quickly. Moreover, an excess number of carriers were required because the carts could haul only small loads since they were, themselves, small. (Table 8.4)

TABLE 8.4

WAGE EARNERS EMPLOYED IN THE CARTAGE TRADE BY REGIONS, 1897

Regions	Number Employed
1. Agricultural Center	13,534
2. Middle Volga	19,505
3. Lower Volga	13,742
4. New Russia	32,507
5. Southwest	17,776
6. Little Russia	12,069
Total for Black Earth Regions	109,133
7. Industrial Center	51,028
8. White Russia	13,903
9. Lithuania	11,064
10. Lake Region	41,213
11. Ural Region	21,756
12. Baltic Region	8,086
13. Northern Region	2,391
Total for Non-Black Earth Regions	149,441
14. Russian Poland	20,691
15. Transcaucasus	25,845
16. Central Asia	15,254
17. Western Siberia	6,741
18. Eastern Siberia	4,290
19. Far East Siberia	3,123
GRAND TOTAL	334,518

SOURCE: Tsentralnyi statisticheskii komitet. Pervaia vseobshchaia perepis naselniia Rossiiskoi Imperii 1897 g. Volumes 1-89. St. Petersburg, 1899-1904.

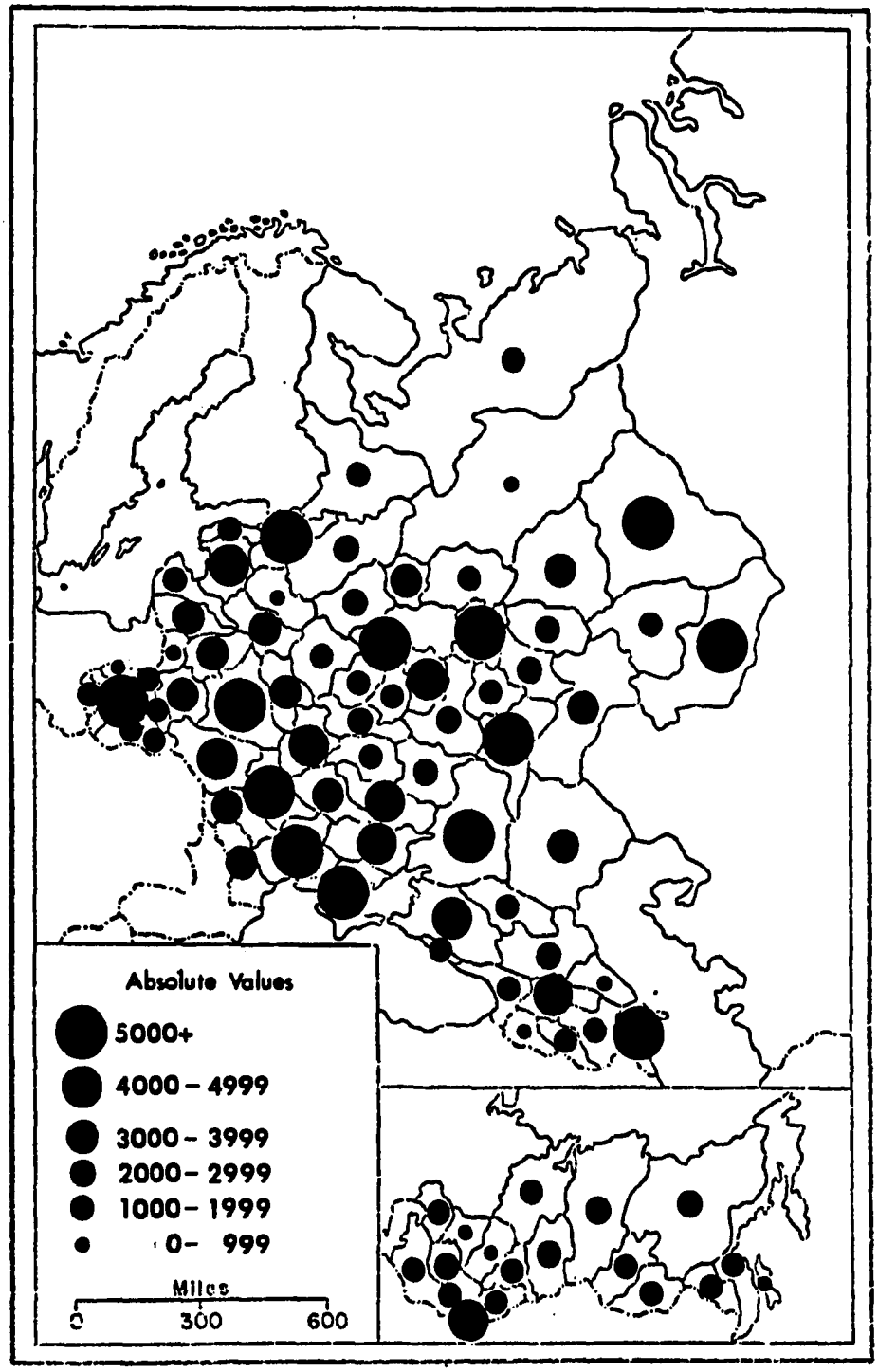
Despite the small area that comprised Russian Poland, many carters made a living in that part of the Empire. Even vast and under-populated Siberia required wagoneers to ply the back roads near provincial capitals and colonial settlements. Fewer truckers were located in Transcaucasus, with the exceptions of the Baku and Tiflis provinces, two of the region's main trade centers. (Fig. 8.1)

Cartage versus Railway Employment. It was well-known that the Russian railway system was organized to shorten distances. But rail lines did not go everywhere in such an immense land, nor were they able to adequately service the intermediate areas or remote provinces. Because of this, carters far outnumbered workers in the railway industry.

There were 72,309 more wage earners in drayage than were employed in rail transportation in 1897. Where railway extensions were nonexistent or meager, the traditional cart and sledge were the common modes of carriage. Away from the central core of European Russia, where the density of rail lines was greatest, the west, southwest, far north, and regions of Transcaucasus and Siberia relied upon teamsters to move commodities. Cartage workers dominated in fifty-two provinces, whereas laborers in rail transport were more common in thirty-seven governments.

Fig. 8.1

DISTRIBUTION OF WAGE EARNERS IN THE CARTAGE INDUSTRY, 1897



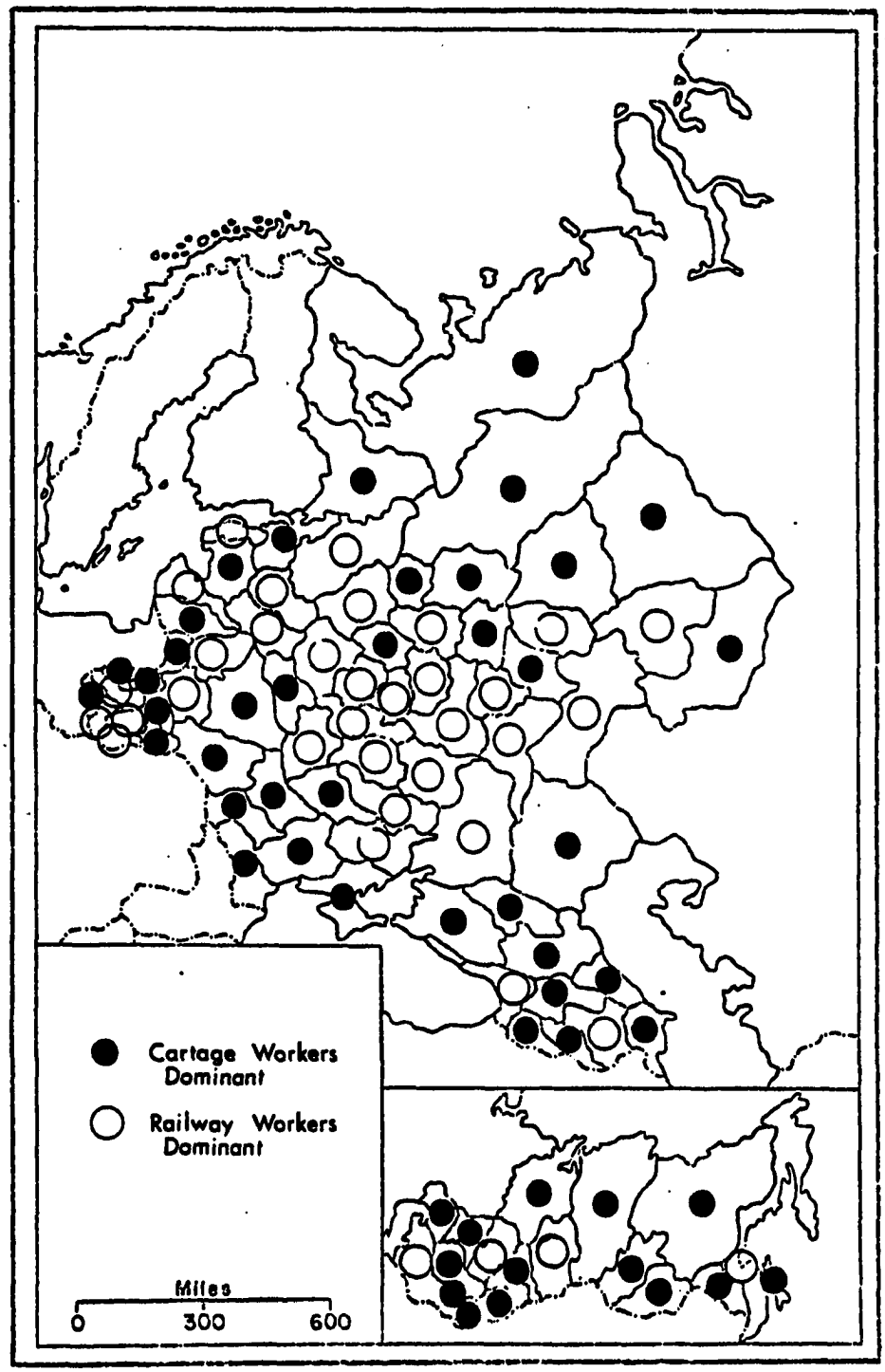
SOURCE: Tsentralnyi statisticheskii komitet. Vols. 1-89. St. Petersburg, 1899-1904.

The strength of drayage as an occupation was also pronounced in comparison to geographical regions. Out of Russia's nineteen regions, carters were prevalent in fifteen while workers in rail only in four. Rail transportation was important in the Agricultural Center, New Russia, Little Russia, and White Russia, all located in south and central European Russia. This was partly because of the administration's policy to connect the grain-producing regions with the population districts in the north. Also famine relief was another prime motivator to connecting southern Russia to northern Russia. (Fig. 8.2)

Cartage versus Water Employment. When comparing teamsters to waterway transportation, the distribution and concentration by guberniias was overwhelmingly in favor of drayage. Dockhands were dominant in only four provinces: Archangel, Olonets, Nizhni-Novgorod, and Astrakhan. Archangel and Olonets provinces in far northern Russia required an ample number of river hands because of seasonal lumbering activity. The short navigational season saw feverish exertion on streams and rivers as vast quantities of timber were floated to sawmills and river ports. The large Arctic Ocean port of Archangel accommodated west European ships that carried wood products. Nevertheless, drayage employment not that much less in both provinces. The lumber merchants

Fig. 8.2

COMPARISON OF REGIONAL EMPLOYMENT BETWEEN CARTAGE AND RAILWAY WAGE EARNERS, 1897



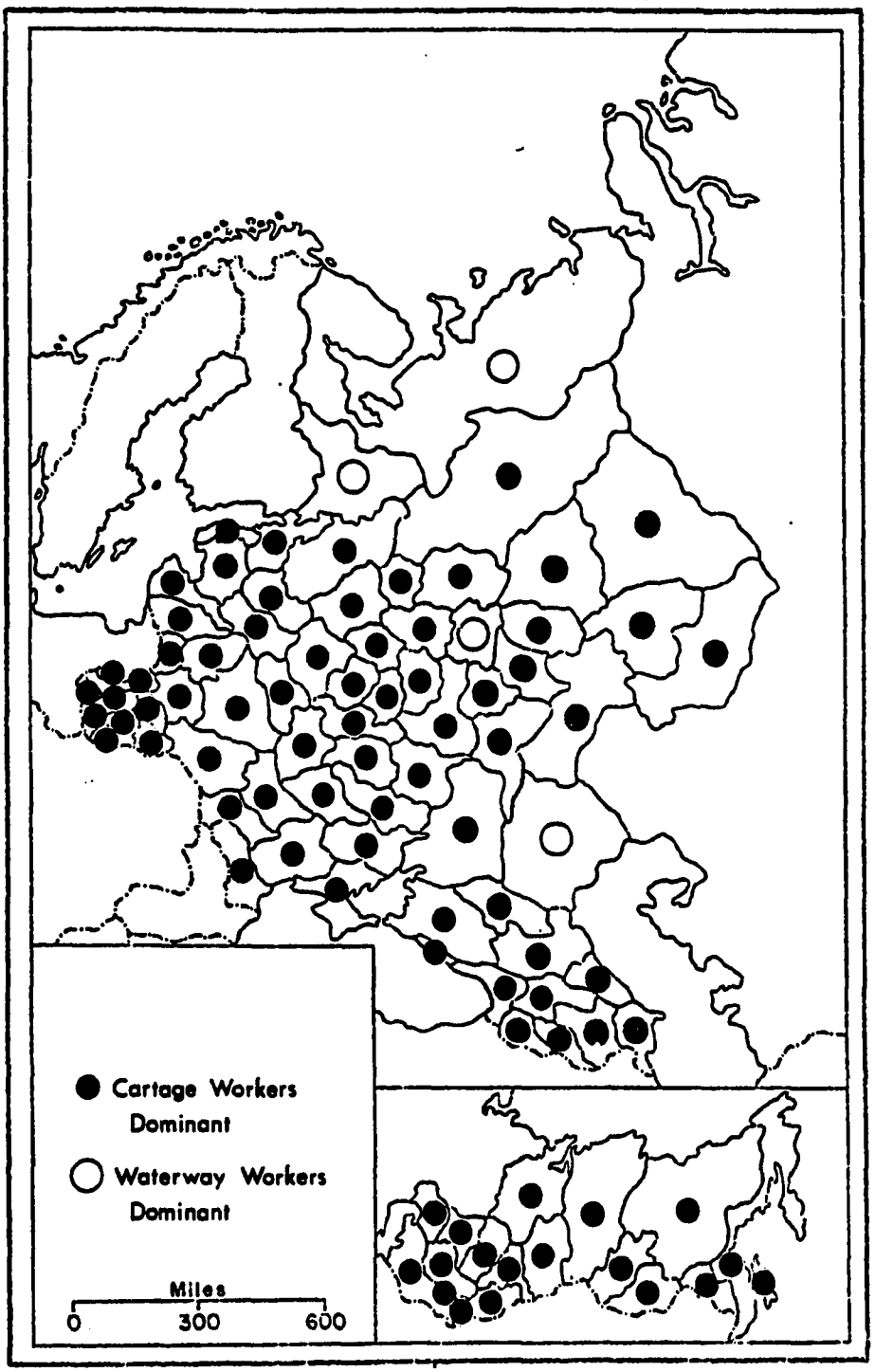
SOURCE: Tsentralnyi statisticheskii komitet. Vols. 1-89. St. Petersburg, 1899-1904.

required cartage when all the rivers were frozen. The felled trees were dragged by winter carters to the river banks until the opening of the spring floating season. (Fig. 8.3)

The Census of 1897 revealed that over 8,000 river hands worked in Nizhni-Novgorod province, a strategic location for the Volga River commerce. Barges destined for Moscow and St. Petersburg from the south usually wintered in the city of Nizhni-Novgorod. The world's largest fair near the city required dock service since it was located on the Volga River. At the terminus of the Volga, Astrakhan, an abundant supply of dockworkers were required for transshipment of goods from Central Asia. When regional relationships are considered, river hands did not match drivers of carts and sledges in numbers. Teamsters out distanced water laborers by 264,553 workers and were superior in every geographical region. The rivers, streams, and inland lakes that were frozen many months of the year could not provide the uninterrupted transportation needed. Neither were they suitable in many provinces because of flat terrain and low water that only became navigable for several brief weeks during the spring floods. The advantage of water transport over cartage was in bulk not speed or time. In the late 1820s, the average flat-bottomed barge on the Volga River (without oars and floating downstream) traveled only 4.3 <u>versts</u> (about

Fig. 8.3

EMPLOYMENT COMPARISON BETWEEN CARTAGE AND WATERWAY WAGE EARNERS, 1897



SOURCE: Tsentralnyi statisticheskii komitet. Vols. 1-89. St. Petersburg, 1899-1904.

three miles) per hour (Erman, 1848, vol. 1, p. 290). The demand for transportation was compensated by vehicles on wheels and runners.[4] (Table 8.5)

Sex, Age, and Ethnic Characteristics

In 1897, cartage was demanding work since lifting heavy articles and managing horses and conveyances required stamina. Strength and endurance were the hallmarks of seasoned drivers. Because of this situation, carriers were primarily male and young.[5] Out of a labor force of 334,518 teamsters, 3,667 were women, or less than one percent of the total. The core of carters came from the 20-39 and 40-59 age groups. Still it was not unusual to employ both the very young and the elderly. There were 377 wage earners under the age of 12 including 18 young girls. Drivers over sixty years of age were more numerous than carriers from 17-19 years of age when durability was expected, a situation that increased risk in injury. Manufacturing establishments reported that

---

[4]Appendix G gives specific data regarding rail and water employment.

[5]Russian labor officials differentiated workers into three separate age groups: (1) adults over 17 years of age, (2) young people from 15 to 17, and (3) children from 12 to 15 years of age (CR, 1909, p. 575).

TABLE 8.5

COMPARISON BETWEEN DRAYAGE, WATER, AND RAIL TRANSPORT EMPLOYMENT BY GEOGRAPHICAL REGIONS, 1897

	Regions	Carter	Water	Rail
1.	Agricultural Center	13,534	1,118	35,450
2.	Middle Volga	19,505	12,428	15,544
3.	Lower Volga	13,742	6,104	7,346
4.	New Russia	32,507	10,074	34,650
5.	Southwest	17,776	1,057	13,024
6.	Little Russia	12,069	1,099	16,081
7.	Industrial Center	51,028	7,152	27,514
8.	White Russia	13,903	1,852	17,501
9.	Lithuania	11,064	495	10,419
10.	Lake Region	41,213	5,880	15,829
11.	Ural	21,756	3,815	7,704
12.	Baltic	8,086	4,836	7,579
13.	North	2,391	2,138	1,014
14.	Russian Poland	20,691	1,156	18,416
15.	Transcaucasus	25,845	5,517	16,902
16.	Central Asia	15,254	1,318	6,869
17.	Western Siberia	6,741	1,668	6,177
18.	Eastern Siberia	4,290	476	1,363
19.	Far East Siberia	3,123	1,872	2,827
	TOTAL	334,518	70,055	262,209

SOURCE: Tsentralnyi statisticheskii komitet. Pervaia vseobshchaia perepis naselniia Rossikoi Imperii 1897 g. Volumes 1-89. St. Petersburg, 1899-1904.

from 1901 to 1906, wagons and carts were responsible for 3,961 industrial accidents (Rubinow, 1911, pp. 2166-71).[6]

Numerous and diverse nationalities were drawn into the orbit of cart and sledge carriage occupations. The Slavs comprised 71 percent of all employed wage earners. Slavic-Jews and Turkic-Tatars followed with twelve and nine percent respectively. The Finns, Lithuanians-Latvians, and Georgians trailed. More than 11,000 wagoneers were divided among the many other non-Russian inhabitants. (Table 8.6)

The transportation of goods by Jewish carters was highly concentrated in the fifteen southwest and western provinces commonly along the borders of the "Pale" of Jewish settlements. The explanation of this dominance is based in historic anti-Semitism. Since it was almost impossible for Jews to own land and enter certain professions, many naturally turned to cartage as a means of livelihood. (Fig. 8.4)

Similarly, the treatment of Turkic minorities by St. Petersburg was not much different from the Jewish population. Tatars were important in the carting industry on the eastern and southern flanks of the Empire. They transported cotton in Central Asia, petroleum products in Transcaucasus, loading and unloading goods in the lower Volga River provinces, shifting mineral ore and charcoal in the Perm, Orenburg, and

---

[6]A comprehensive breakdown of sex and age characteristics is given in Appendix H.

TABLE 8.6

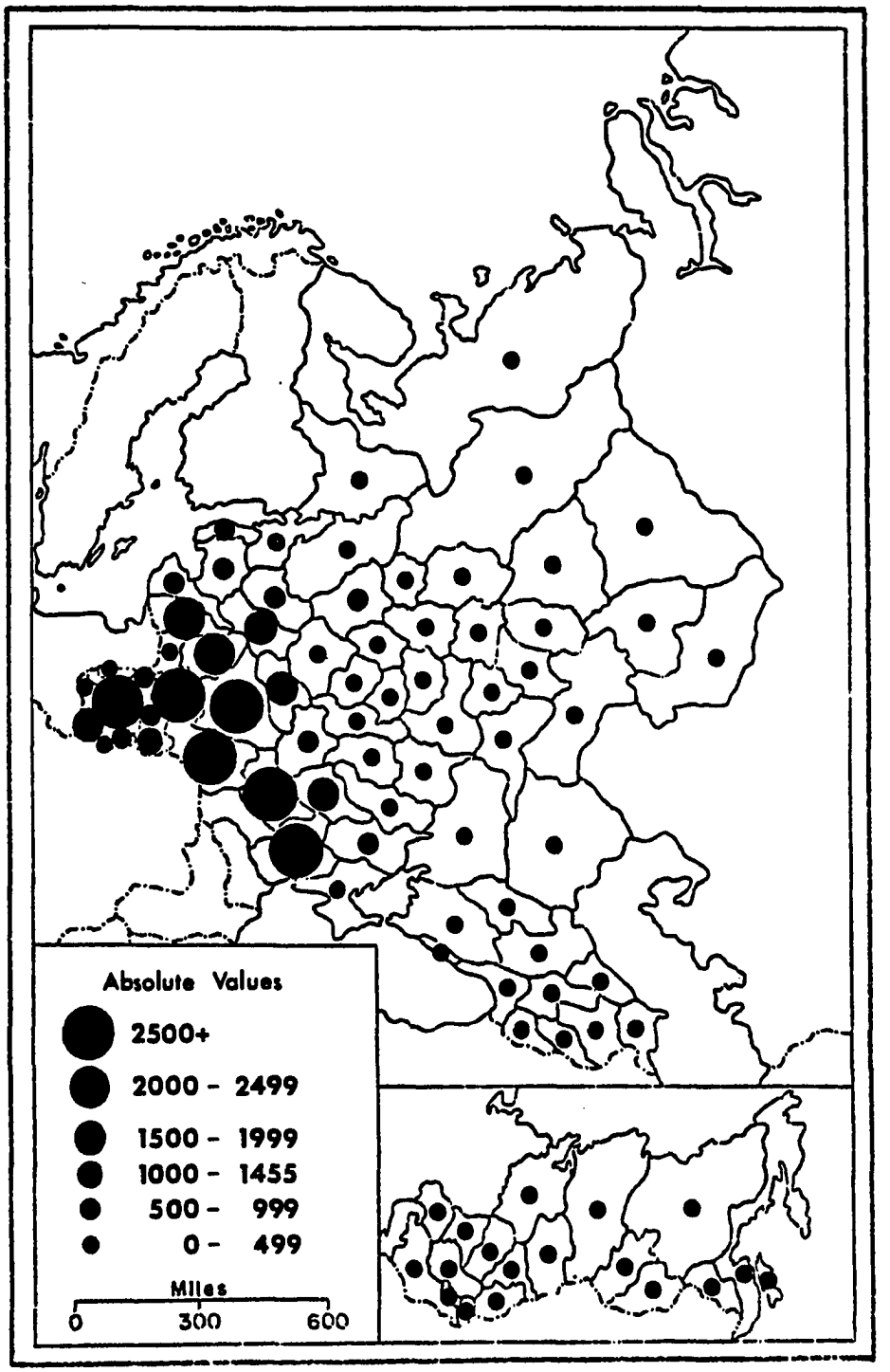
NUMERICAL DOMINANCE OF CARTERS
AND CARRIERS BY NATIONALITY

	Nationality	Number of Wage Earners	Percent of Total Carters
1.	Slavic	237,136	71
2.	Jews	41,731	12
3.	Turko-Tatar	28,513	9
4.	Finn	6,598	2
5.	Lithuanian-Latvian	5,344	2
6.	Gruzian (Georgian)	3,230	1
7.	Others	11,966	3
	TOTAL	334,518	100

SOURCE: Tsentralnyi statisticheskii komitet. Pervaia vseobshchaia perepis naselniia Rossiskoi Imperii 1897 g. Volumes 1-89. St. Petersburg, 1899-1904.

Fig. 8.4

DISTRIBUTION OF JEWISH WAGE EARNERS IN CARTING, 1897



SOURCE: Tsentralnyi statisticheskii komitet. Vols. 1-89. St. Petersburg, 1899-1904.

Ufa guberniias, and hauling imported and exported commodities to and from the Black Sea ports. Other ethnic groups were dominant in regions historically associated with their cultural development. (Fig. 8.5) In addition to general drayage, Imperial labor authorities made several distinctions regarding specialized carting. The categories in 1897 were determined on the basis of what was hauled: (1) petty teamsters, (2) mineral ore carriers, (3) hand carriers, (4) cabdrivers, and (5) firewood and lumber carters.

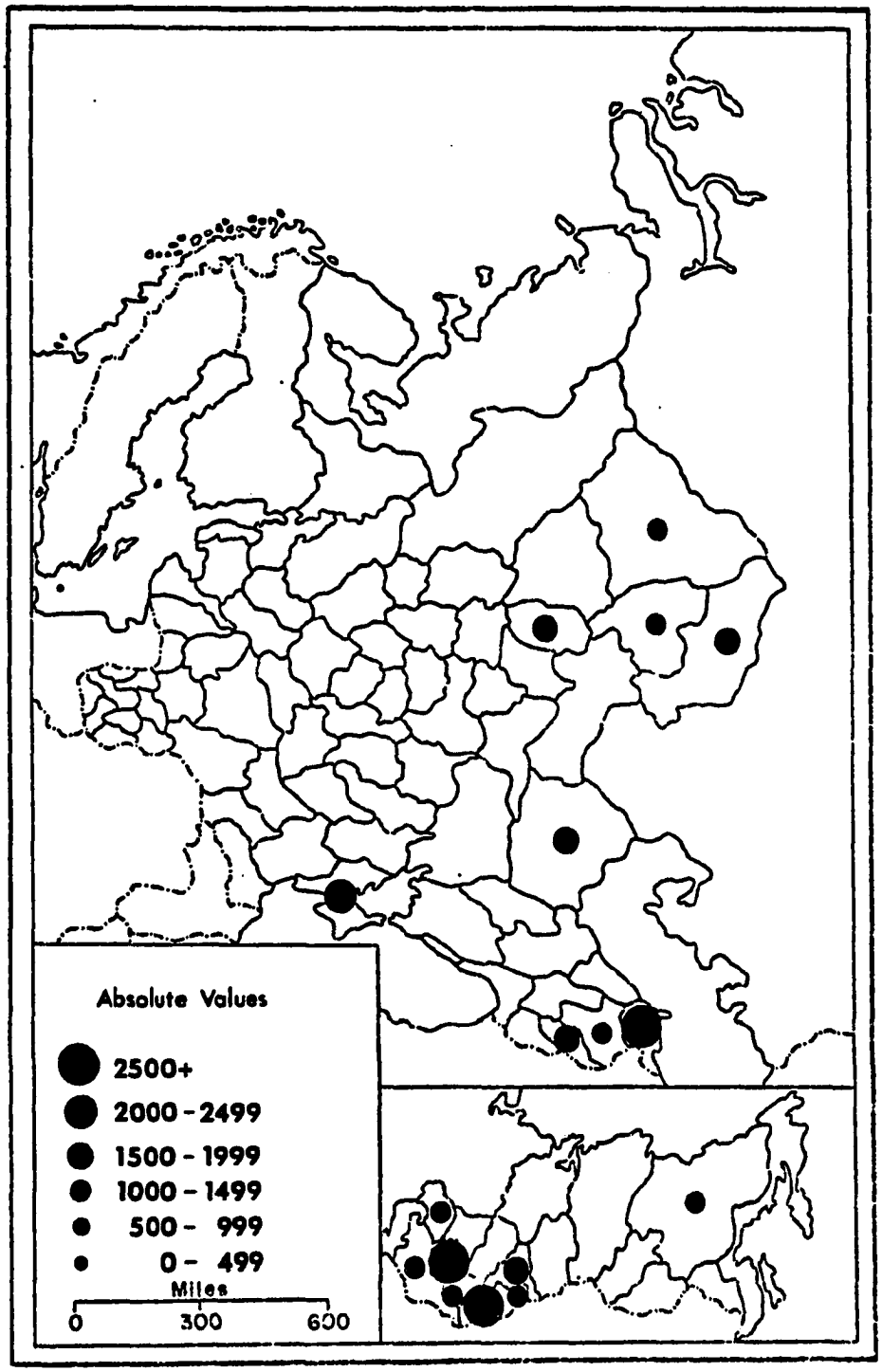
Petty cart transport was never large. Wagoneers in this group carried material that was not in the mainstream of land carriage. In other words, they worked for individuals who did not own equipage or for merchants who required only limited transport. Also, they picked up the slack when artels were over extended. Mineral haulers numbered over 18,000 workers, 67 percent were located in the Ural Region, and another 10 percent in New Russia, a metallurgical area in southern Russia. The nearly 4,000 foot carriers revealed wide spatial distribution. They were strong in grain regions, along river ports, and where the fairs were located. The carriage of passengers was important. Every province showed a good supply of cabbies. The prevalence of passenger carriers was related to population density and urban settlements.[7]

---

[7]See Appendix I for additional specific information.

Fig. 8.5

DISTRIBUTION OF TURKIC WAGE EARNERS IN CARTING, 1897



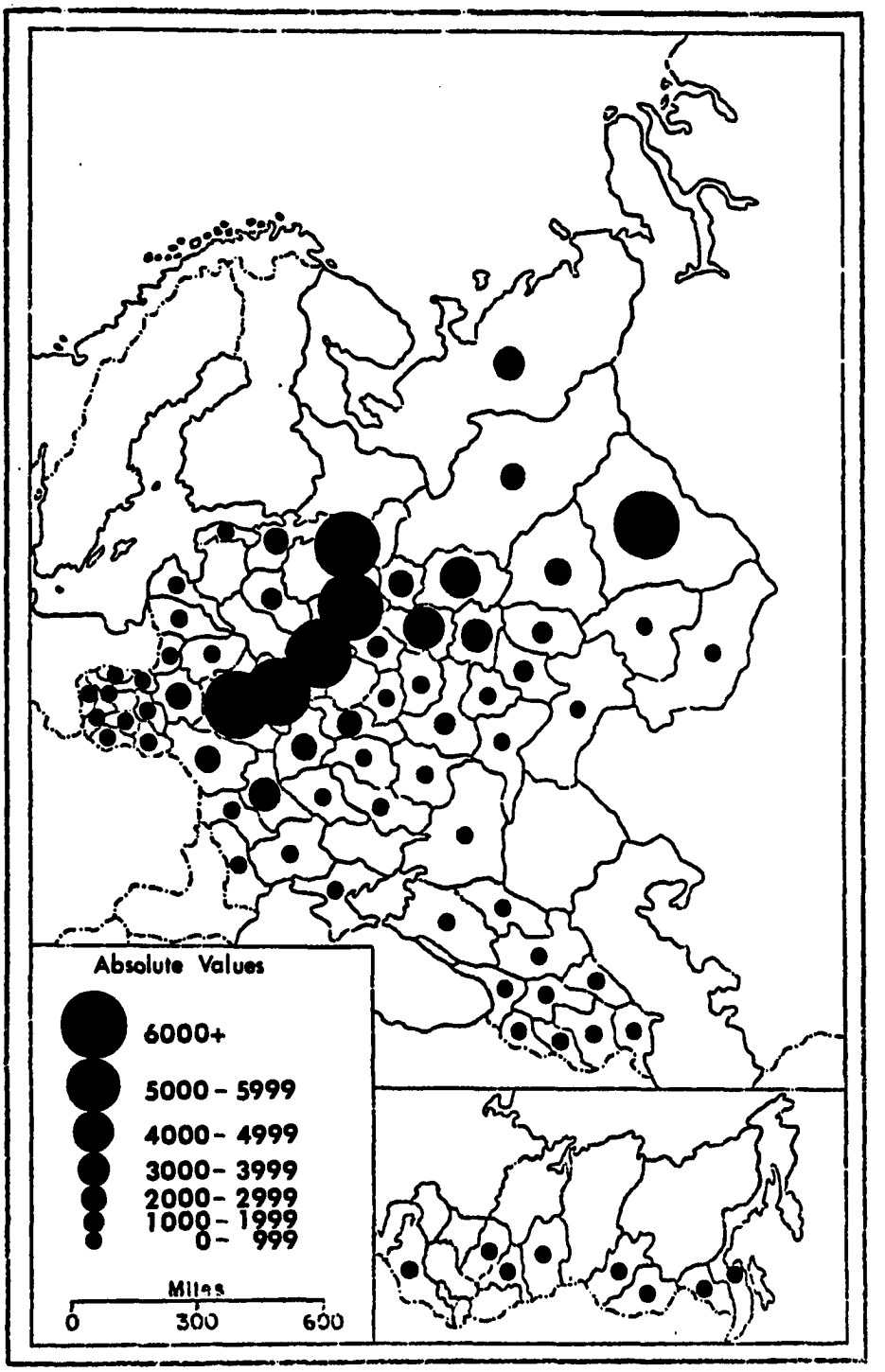
SOURCE: Tsentralnyi statisticheskii komitet. Vols. 1-89. St. Petersburg, 1899-1904.

The necessity of bringing wood from the forest to cities and villages was an immense job and required a work force of more than 123,000 carriers in 1897.[8] Carters of firewood showed a remarkable distribution pattern. From the province of Minsk in the west in an arc from Mogilev, Smolensk, Tver, to Novgorod in the north contained the country's greatest work force in carrying fuel. The province of Perm in the east had many wood carters to supply the Ural iron industry. Secondary regions were around the Moscow and St. Petersbug provinces. The reason that northern governments had few wood carters was because of few settlements and abundant forests nearby. The steppe and desert regions had no use for wood teamsters. In Siberia, villagers took advantage of the immense forest tracts available and required minimal truckers in this occupation. Russian Poland's wood deliverymen were few because of the centuries of exploitation of its forests creating scarcity. Thus, Polish homes, especially in the cities, used coal for domestic heating. (Fig. 8.6)

---

[8]This category of employment included workers in floating firewood and timber. It was presumed that more laborers were in the cartage end of firewood transportation since this mode was the only way to haul the articles from rivers to the distant interior settlements. Moreover, it was shown earlier that labor in waterway transportation was small when compared to drayage employment.

DISTRIBUTION OF WAGE EARNERS IN FIREWOOD AND LUMBER CARTING, 1897



SOURCE: Tsentralnyi statisticheskii komitet. Vols. 1-89. St. Petersburg, 1899-1904.

The Russian Profession of Pedlars

An important feature in Tsarist trade was the cartage of goods within and among the regions by itinerant hawkers, a situation that points to the inability to coordinate transportation facilities in a big country. Every section of the Empire was provided with a large supply of traveling salesmen. Certain groups became well-known throughout the land for their hawking. Among the Russian inhabitants, for example, the term "Suzdalian" was synonymous to pedlars from the district of Suzdal, a tradition of employment handed down from one generation to the next. Tatar hawkers, called "Bukhartzi," were another well-known group of traveling pedlars (Reclus, 1883, pp. 398, 400).

Consumer mobility was severely curtailed because of roadlessness, travel restrictions, and distances that forced inhabitants to remain close to home. Therefore, peasant consumers in remote districts relied upon an army of independent door-to-door salesmen that roamed from village to village selling commodities that otherwise would have been unavailable. With their vehicles, they carried pots, pans, yarn, cloth, thread, needles, nails, saws, shears, hammers, rope, soap, clothing, candy, and specialty items--a veritable general store on wheels.

All wandering wagon-stores were required to have a government traveling permit. In the 1860s, the hawker's certificate amounted to fifteen rubles per year for a cart and six rubles for pedestrian pedlars (TSS, 1865, p. 408). Government estimates in 1844 showed that 13,072 nomadic pedlars serviced the state. Of these, 7,800 were located in European Russia, 1,399 in Russian Poland, and 3,803 in Central Asia and Caucasus (S.Sov., 1887, pp. 146-49).

The distribution of hawkers in 1897 was 103,813. Out of this, men outnumbered women pedlars almost 5 to 1. The Industrial Center, the Lake Region, and Russian Poland were areas that profited from this selling. Because these districts, where manufacturing and Russia's main population cores were centered, had wares more readily available than in the countryside. Moreover, the Empire's best roads and highways were in place, making travel easier, quicker, and more frequent. The large distribution in New Russia was the result of demand from towns and villages in the vicinity of Krivoy Rog and Donetsk industrial centers. The Black Sea ports also attracted wandering salesmen. Despite tremendous distances, Siberian and Central Asian villages were not without their traveling general stores. The provinces of Tiflis and Baku in the Caucasus were outstanding in wares carriage. The only region where this form of private enterprise was small was in far northern Russia where low

population densities and short summer travel season restricted the traveling pedlars. (Fig. 8.7)

Conclusions

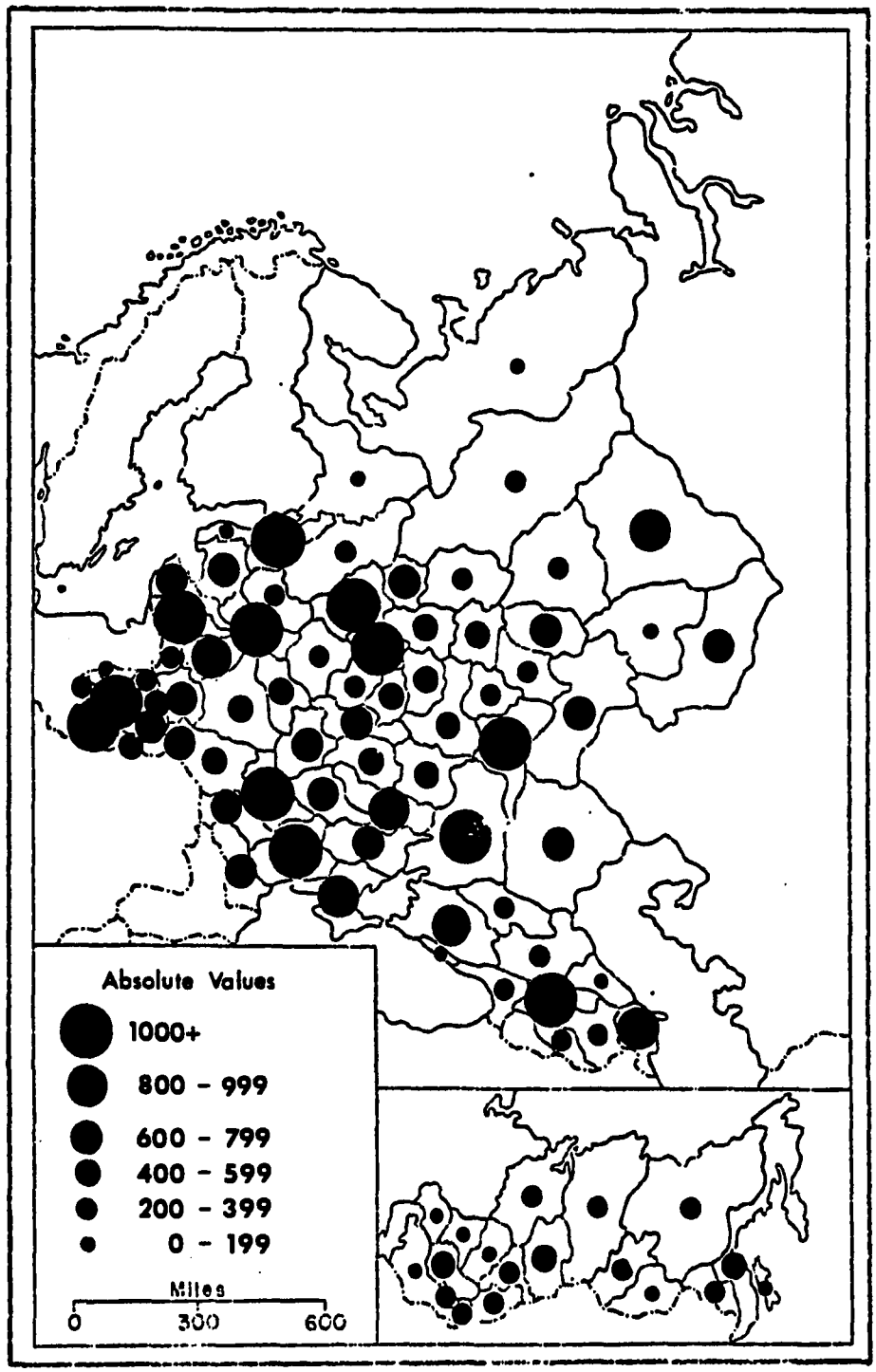
The cartage industry was an important free enterprise occupation. The carriage of commodities of every shape, make, and size by millions of vehicles was a service that Russia could not do without. Whether in rural or urban surroundings, the teamsters were forced to obey complicated rules of travel and commerce regarding tolls, bridge tariffs, and legal routes of travel.

Every guberniia were not without hordes of wagoneers on the payroll. The trucking industry employed large contingencies of laborers, and rail and water transportation employment were no match. Drayage primarily depended on a male work force, but females were not exluded and neither were the very young nor the elderly. The diversity of carting was across every important nationality, but the Slavs, Slavic-Jews, and Turkic-Tatars were overwhelmingly dominant.

Cartage labor was essentially a two-tiered occupation. Carriers were either members of artels, or they were non-union oriented. Workers who belonged to cooperatives generally made a living as full-time carriers, whereas unattached truckers were temporary drivers. Whether union or independent, teamsters were seldom without work in a country where

Fig. 8.7

DISTRIBUTION OF WAGE EARNERS IN THE HAWKING-CARRYING TRADE, 1897



SOURCE: Tsentralnyi statisticheskii komitet. Vols. 1-89. St. Petersburg, 1899-1904.

motorized transportation was poorly developed and rail integration was not completely effective with Russia's industrial and agricultural economies. As a result of poor transportation, a particular type of land carrier evolved, the pedlar or traveling merchandise store. If bad national and district roads restricted the inhabitant's mobility, traveling wagon-stores by the thousands found their way to isolated settlements.

The role of land cartage in the economic development of Imperial Russia cannot be dismissed as a trifle. transport situation. The impact and status of the "blackwork" depended upon muscle and brawn and was an important alternative to normal land distribution.

CHAPTER IX

ROAD TRANSPORTATION AND ECONOMIC DEVELOPMENT

Introduction

It is hard to imagine manufacturing and agriculture without land transportation. In the case of Tsardom, business had to contend with substandard roadways and severe cartage interruptions, which in turn caused the tempo of economic development to be unusual and erratic. The businessman and peasant farmer were confronted with overland transportation that effected production, management, wages, and prices of most commodities. Vast distances, a preponderance of dirt roads, and *rasputitsa* were interrelated factors that contributed to the backwardness in industry and the stresses in agriculture. Industrialists and rural inhabitants alike experienced painful results when carts were a necessity in order to conduct trade.

The first part of this chapter discusses road and highway transportaion and its effect on industry, whereas the interplay between the rural economy and land carriage is treated in the second part.

Method and Pattern of Business

The industrial revolution in Europe was enhanced in part because of modern transportation. European government leaders and entrepreneurs understood the relationship between good macadam highways and industrial success. In Russia, road policy took a backseat. Factories, mills, and shops that depended on cartage were subsequently unable to modernize since land carriage was thwarted.

As a consequence of an archaic network of thoroughfares, Russian industry was guided by the principle of samovlaste (autarchy). In essence all production requirements took place in self-contained industrial colonies or estates (Gerschenkron, 1970, p. 16). This concept of manufacturing required businesses to own vast territory in order to be as close as possible to natural resources and peasant labor, but all at the expense of being some distance from the market centers (Alexinsky, 1918, pp. 132-33). Therefore, industrial enterprises, out of necessity, were located in the countryside. In the beginning of the twentieth century, 63 percent of all industry and 70 percent of employment were located in rural Russia and not in the urban areas (Laue, 1964, p. 48; Rimlinger, 1968, p. 212). A Russian economist, writing in a Tsarist publication, gave an appraisal of samovlaste:

> The vast distances of the Empire go hand in hand with sharp differences of national conditions: one locality is rich in timber and wild animals, another in cattle, while a third abounds in clay or iron-ore deposits. These natural features determine the character of industry. The great distances and inconveniences of communication made the transport of raw materials impossible, or extremely costly. As a result, industry had necessarily to nestle where an abundance of raw material was close at hand. Hence, the characteristic feature of our industry--the specialization of commodity production in large compact areas (Lenin, 1956, p. 468).

As one individual stated, "The more industrialized areas of Russia were like islands in a vast agrarian sea. . ." (Thalheim, 1971, p. 90). From an interview with a manager of an iron mill, an idea of the internal operation is given:

> There was a time, which I still remember, when the Ural plants on their own large estates produced everything themselves, up to the last nail; even cables and tallow candles for the miners came from the plant shops. They had their own sewing workshops for making footwear for the workers, their own paper mills, and their own pottery works for making inkwells and sand boxes (Balzak, 1949, p. 120).

The extent of land owned by the industrial estates depended upon what was being produced. In 1874, for example, to support one Ural iron furnace, a minimum of 25 square kilometers (about 16 square miles) of forest was the rule (TE, 1874, p. 443). In other instances, timber for charcoal was carted as far as 100 versts (about 66 miles) in the Ural Mountains (De Tegorborski, 1856, vol. 1, p. 126). Situations

like this forced a pood of iron to increase in cost by one-third of production (Crisp, 1976, p. 63). Cartage costs, back and forth over wide areas, caused iron manufacturers to go bankrupt (Goldman, 1954, p. 23).

The state, zemstvos, or zemsky governments were not responsible for building roads within the legal domain of private companies. Instead, all highways were built and maintained by each mill colony (Kahan, 1965, p. 83). Concessions granted to foreign firms, on the other hand, were required by law to construct new roads and bridges that serviced their geographical territory (Crisp, 1976, p. 166). One such company, the Verkne-Serginski iron works located in the Urals, laid some 85 versts (about 56 miles) of roadways to their iron ore supply, 9 versts (about 6 miles) to forest tracts, and 25 versts (about 16 miles) to charcoal sites. The 119 versts (about 80 miles) of thoroughfares cost the establishment approximately 440,000 rubles (about $226,000) during the late 1800s (Burstein, 1963, p. 114).

Despite efforts to build company-roads, the richness of Russia's natural wealth could not be connected with the huge stretches of macadamized highways. Deficient regions had no choice but to look abroad for raw materials since the cost of land carriage in their own country was exorbitant. Coal in southern Russia, for example, was of no use to the northern mills. It was cheaper to import coal from England.

From 1886 to 1890, Russian industry also bought coal from Germany, Austria, Norway, Holland, and as far away as Spain (TRT, 1900, p. 50).

Financial Management. The consequences of irregular land carriage transport and the expense had perilous effects on Tsarist borrowing and lending practices. Abnormal and unstable financial conditions held back economic growth and monetary stability. The economic depression in 1912, for instance, was blamed entirely upon the bad state of affairs of Russia's roads. Normal cartage was impossible because rasputitsa was longer than usual, and the muddy roads were impassable until they dried. The upshot of this was the reduced demand for cash and banks had to increase their discount rates on borrowed capital. This snowballed to cause exports to drop off and the value of foreign currency to diminish. To counter this chain of events, the Imperial Bank of Russia raised its interest rate on loans for stock credit (Snodgrass, 1913, p. 21).

When it came to credit on business accounts, businessmen considered distance, which could in turn cause delays. The large cotton mill, the Zundell Company, in the early 1900s, insisted on a minimum of six months' credit on contracts. In earlier times, when land carriage was unpredictable, twelve to eighteen months was the rule (Odell, 1912, p. 34). In

Siberia and Central Asia, where distances were considerable and good roads rare, credit ranged from nine to twelve months (Baker, 1916, p. 24).

Markets-Prices-Wages. The difficulties brought about by road transportation also encouraged restricted markets, wide price ranges, and unequal wages to occur. Manufacturers in many provinces had a narrow distribution range of only sixty versts (about forty miles) from their base (Lenin, 1956, p. 358). Situations such as this perpetuated non-competitive prices to arise as well as wide differences in wages (Golovine, 1846, vol. 1, p. 115). More pointedly, the Russian economist De Tegorborski stated:

> We have seen that a pood of iron, which cost 80 or 90 kopecks at the Ural iron-works, sells for 2 rubles or more in the western provinces; a sagne of wood purchased in the forest for 25 to 30 kopecks, will sell for 3 rubles at St. Petersburg; in the same capital a Ukraine ox, which has cost 15 or 20 rubles in the steppes, will sell for 50 or 60; a tchtwert of rye, which often sells for 1½ rubles or less in the interior, will be worth 5 or 6 times perhaps 8 or 9, in the Baltic provinces; and the wheat, which there grown sells for 3 rubles or only 2½, fetches 5 or 6, nay sometimes 10 or 11, at Odessa (De Tegorborksi, 1856, vol. 1, p. 154).

Wages were no different when it came to the geographical disparities. Because isolation was so pervasive, the same work did not command the same wage. Carriage cost for the same distance and weight were low in some governments

and high in others (Alexinsky, 1918, p. 133).[1] The elevator effect of random wages caused concern among labor administrators since the retention of skilled workers was then made difficult. Good workers tended to gravitate toward the better-paying jobs. To reduce the flow of workers from economically depressed regions, wages were fixed in several provinces in a forty square versts (about eighteen square miles) area for a long time (Lenin, 1956, p. 254).

Land Transportation and the Rural Economy

Although Russia manufactured fabricated goods, the Empire was basically an agricultural economy. The difficulties of effectively distributing the harvests were constantly jeopardized since ground transportation was precarious because of the relatively few macadam highways.

The cause and effect of roadlessness was particularly evident in southern Russia in the Black Earth Region, the granary of the Empire, raised its ugliness. The soil and climate made this area suitable for large-scale grain production, whereas the weather and infertile ground of

---

[1]For a comprehensive list of over 700 occupations and wage variations, see the official Russian report in, The Industries of Russia, vol. 2, pp. 523-38. Several hundred more can be obtained from the American document, Fifteenth Annual Report of the Commissioner of Labor, 1900.

the north, where the large cities and industrial districts were found, were more suited for settling than seeding. In consequence, a dualism between the area of "have-not," the north, and the area of "have," the south, was a significant test of the Tsarist roads and highways in uniting the region of agricultural deficit with that of agricultural surplus.[2]

From seed to cereal, the economic organization in distribution from the south to the north, long before the coming of the railways, had no geographical bound to the radius of the market. Carting labor was the substitute for bad roads, as millions of single vehicles and long grain freight trains were headed northward to Moscow, St. Petersburg, and the Baltic sea ports or were destined to European markets via the Black Sea. Foreign wheat and corn brokers were concerned every year about delays if rasputitsa came early or stayed late (Oliphant, 1854, p. 178). Alluding to land carriage irregularity and distances, Tsar Alexander II

---

[2]After Obukhev, the Black Earth provinces were: Kursk, Orel, Tuls, Riazan, Tambov, Voronezh, Simbirsk, Penza, Kazan, Saratov, Samara, Orenburg, Astrakhan, Don, Kharkov, Poltava, Chernigov, Volynia, Kiev, Podolia, Kherson, Bessarabia, Tavrida, Ekaterinoslav, and Ufa. Non-Black Earth: Archangel, Olonets, Vologda, Novgorod, St. Petersburg, Pskov, Estland, Lifland, Kurland, Kovno, Vilna, Grodno, Vitebsk, Minsk, Mogileve, Smolensk, Kaluga, Tver, Moscow, Vladimir, Yaroslavl, Kostroma, Nizhni-Novgorod, Viatka, and Perm (Lorimer, 1946, p. 211).

in 1862 stated that, "They say it is impossible to bring in their grain in carts and wagons from one to five hundred miles into Odessa and be able to compete successfully in English and French markets with the United States" (CR, 1862, p. 340). The American Consul to Odessa in 1876 reported that once grain arrived from the interior over land, it was as expensive as sea transport from Odessa to London (CR, 1877, p. 800). Nevertheless, grain had to be carted long distances despite high cost or remain behind and rot. In the 1840s, about 30,000 teams of oxen carried millions of pounds of wheat to southern ports (Nechkina, 1953, pp. 280-81). Grain brought from the hinterland in 1882 by land carriage amounted to 100 million rubles (about $51 million) (Marvin, 1884, p. 114).

Since railways and waterways could not do everything at all times and at all places, cartage was inevitable. By way of illustration, a triangular region between the cities of Kherson, Nikopol, and Melitopol, around the area of Belgium in 1900, no railroad was built (Kononenko, 1958, p. 210). In the entire Black Earth region, during the late 1800s, country roads were on the average about 100 miles from any rail line (Shiskoff, 1892, p. 5). As difficult as rural roads could be, they can be appreciated when considering that from 1838 to 1845, not one mile of railway was laid (TEM, 1871, p. 197). The season of bad roads

was particularly hard on farmers who lived some distance from their plots. In the mid-nineteenth century, central European Russians lived as far as ten to fifteen versts (about seven to ten miles) from their fields. In Saratov and Simbirsk provinces where local roads were out of sight during rasputitsa, tillers traveled to their plots only twice a year, at planting and harvest, but remained camped there until all work was done (De Tegorborski, 1855, vol. 1, p. 235). (Table 9.1)

The Road Network in the Black Earth. The granary of Russia, as vital as it was in feeding its people and for export, conducted agriculture under extreme conditions when it came to cart and wagon transportation. In 1904, for example, the Black Earth area was traversed with only 2,717 miles of paved state trade-roads that were spread over an area of 18 guberniias. The other 49,000 miles of roadways were dirt, this complicating carriage in the rainy season and the thaw period. The province of Orenburg showed a meager three miles of macadam roads. Hard-surfaced roads in any number were only to be found in Taurida with 503 miles; Podolia, 414 miles; Volynia, 606 miles. The government of Kherson had the best network of dirt roads with 6,180 miles to serve about 52 percent of wheatlands in cultivation. (Table 9.2)

TABLE 9.1

TRANSPORTATION FACILITIES IN THE BLACK-EARTH PROVINCES, 1904

Provinces	Percent of land cultivation for wheat	Percent of total area cultivated	Railway Mileage (miles)	Navigable Waterways (miles)	Macadam Roads (miles)	Earth Roads (miles)
Orenburg	61.6	11.5	326	237	3	1,502
Astrakhan	57.6	2.1	94	677	2	3,186
Samara	54.0	29.4	907	895	22	4,959
Kherson	51.6	54.3	739	539	69	6,180
Ekaterinoslav	51.6	54.3	1,398	341	45	4,021
Taurida	49.2	48.6	488	103	503	3,270
Don Army Territory	49.0	30.5	1,286	1,555	(a)	(a)
Bessarabia	34.4	53.0	530	1,078	59	1,159
Poltava	32.7	47.3	698	253	126	1,514
Kharkov	31.8	42.8	765	168	89	3,794
Saratov	31.5	33.7	962	591	42	1,281
Podolia	29.1	48.9	789	289	414	2,951
Perm	23.1	7.1	855	2,481	---	2,874
Voronezh	21.4	40.9	812	502	108	2,081
Kiev	20.1	40.9	702	435	194	3,005
Volhynia	14.0	28.2	830	517	606	2,735
Ufa	12.2	7.5	400	2,033	231	2,649
Kursk	7.0	40.6	756	44	204	2,489
European Russia	37.1	25.1	13,337	12,738	2,717	49,650

SOURCE: Adapted after Rubinow, 1908, p. 35

(a) no data

The serious inadequacy of weatherized roads becomes even more acute when compared to the area of provinces in the grain belt to roads per 1,000 square miles. In 1904, the average length of macadam highways was 4 miles per 1,000 square mile area and 68 miles of dirt roads. The provinces of Orenburg, Astrakhan, Samara, and Perm had no paved roads. As a whole, there were more roads per 1,000 square mile area than either rail or water transportation but that was no consolation when the effects of rasputitsa were considered. (Table 9.2)

The end result, of course, was that large amounts of grain were uncarted or left behind to spoil when roads became impassable. The harvest in 1837, for example in the Tambov province lost from seven to twenty million chertvert[3] (about 41.6 to 119 million bushels) of grain due to rotting since the roads were closed because of muddy conditions (Haxthausen, 1856, vol. 1, p. 389). The inability to provide reasonable thoroughfares in the south necessitated five million quarters[4] of grain to be unsold annually during the last quarter of the nineteenth century (Nechkina, 1958, p. 280).

---

[3]One chertvert equaled 5.96 American bushels.

[4]One quarter equaled eleven chertvert.

TABLE 9.2

TRANSPORTATION OPPORTUNITIES IN THE BLACK-EARTH PROVINCES
ACCORDING TO TERRITORIAL EXTENT, 1904

Provinces	Square Miles[a] of area	Mileage per 1,000 square miles of surface			
		Railways (miles)	Waterways (miles)	Macadam Roads (miles)	Earth Roads (miles)
Orenburg	73,254	5	3	-----	21
Astrakhan	91,042	1	7	-----	35
Samara	58,320	16	15	-----	85
Kherson	27,337	27	20	3	226
Ekaterinoslav	24,477	57	14	2	164
Taurida	23,313	21	4	22	140
Don Army Territory	63,532	20	24	(b)	(b)
Bessarabia	17,143	31	63	4	67
Poltava	19,265	36	13	7	79
Kharkov	21,041	31	8	4	180
Saratov	32,624	30	15	1	39
Podolia	16,224	49	18	26	182
Perm	127,502	7	19	-----	23
Voronezh	25,443	32	20	4	82
Kiev	19,676	36	22	15	231
Volhynia	27,699	30	19	22	99
Ufa	47,109	9	14	5	56
Kursk	17,937	42 (c)	2 (c)	7 (c)	139 (c)
European Russia		18	17	4	68

SOURCE: Adapted after Rubinow, 1908, pp. 35; 1911, pp. 14-15.

(a) Figures for 1908
(b) No data
(c) Average

Storage Facilities. It is evident that the surfaces of the dirt roads were in harmony with the seasons that regulated the movement of countryside commodities. When unpaved roads were made difficult for locomotion, perishable products were lost, and when roads were passable, carts converged by the thousands at distributing centers creating "piling-up" due to inadequate storage facilities.

The milk and butter trade in particular suffered because no cold storage system was available. When distances exceeded more than ten miles, peasants were required to put milk into butter (Pavlovsky, 1930, p. 32). In the first decade of the twentieth century, about sixty percent of Russia's egg production was lost because of transportation storage related situations. Interior cities of 30,000 inhabitants could not claim any cold storage operation in the early 1900s (Baker, 1916, p. 37). Likewise, the entire horticulture industry was retarded in Crimea and Central Asia because fruit would spoil before reaching the markets (Henderson, 1946, p. 122). It was not until 1903 that Moscow built its first refrigerated warehouse (TBTJ, 1903, p. 171).

The same conditions occurred when it came to grain storage. The rural roads, when dry, were heavy with carts and wagons trying quickly to reach railway depots before or after the roads were broken up. This abnormal rhythm of delivery caused huge stockpiling and thousands of tons of

corn and wheat every autumn at railway stations rotted because of the lack of protective housing (Marvin, 1884, p. 31). In the mid-nineteenth century, no grain elevators were built in Russia (CR, 1875, p. 1216). In 1901, St. Petersburg erected its first storage silo (Foreign Office, 1901, p. 8). Chicago alone had 89 grain elevators in the 1900s (Rubinow, 1908, p. 23).

To cover the cost of building grain elevators, the government approved a plan by railway directors to collect about 0.2 cents per 100 pounds of grain carried by the railways for their construction (TRG, 1892, p. 315). As an urgent matter, the authorities in 1911 decided to invest from 200 to 300 million rubles in the construction of corn storage silos patterned after the American system (TE, 1911, pp. 51, 610).

Disequilibrium in Prices. Russia was well-known for contrarities, but few things were more unpredictably mysterious and bothersome than agricultural prices and wages. The incontestable fact was that prodigious distances and land carriage deficiencies were directly responsible for price fluctuations that took place in the grain trade (HMM, 1857, p. 150). The result of this peculiarity meant that grain was necessarily noncompetitive (Blum, 1961, p. 306).

The price of corn and flour in 1837 was five times lower in Kiev than in St. Petersburg and about ten times

higher in the province of Livonia than in Tomsk (Rabble and Duncan, 1854, p. 307). According to the condition of roads and highways in the different localities, a mere fifty versts (about 33 miles) changed the price of corn by one-half in the mid-nineteenth century (Haxthausen, 1856, vol. 1, p. 255). Even as roads and highways were improved in the 1890s, little change in prices from place to place were recognized. The integration of the different transport modes continued to be plagued with political and environmental problems. The Director of the Imperial Institute of Ways of Communication in St. Petersburg published figures in 1893 showed that the conditions of agricultural prices were still a Russian dilemma. (Table 9.3)

Famine. There is nothing more devastating than the illustration of the effects of roadlessness in Russian economic history during times of great human suffering such as famine. Because of the extent of famine, they were divided into the golodvka (little hunger) and golod (great hunger) types, occurrences that afflicted the Empire with regularity. The misery brought about by the little hunger famine was provincial, and the misery of the great hunger famine was national. The golod ravaged Russia in 1801, 1808, 1811, 1812, 1833, 1840, 1860, and 1891 (Lanin, 1891, p. 72). Whether local or national, they were commonly

TABLE 9.3

THE GEOGRAPHICAL FLUCTUATION OF PRICES
OF FOUR CITIES IN 1893
(per bushel)

	Petropavlovsk	Omsk	Kainsk	Kolyvan
Rye	70 k./$0.78	70 k./$0.78	25 k./$0.28	25 k./$0.28
Wheat	110 k./$1.39	90 k./$1.13	35 k./$0.43	30 k./$0.38
Oats	90 k./$0.60	80 k./$0.53	20 k./$0.13	42 - 47 k./ $0.28-0.32

SOURCE: The Railway Gazette, 1893, p. 132.

referred to as the time of tchorni den (black day) by the peasants (Haxthausen, 1856, vol. 1, p. 378).

It was regrettable to know that mass starvation could not be alleviated due to the bad roads or no roads in the stricken areas (Skrine, 1904, p. 62). The famines of 1849 and 1853 decimated entire districts, whereas at a distance of only 300 miles, surplus grain was available but could not be transported because of the absence of roads. At distances of twenty-five miles or less, the cost of corn doubled, and about one-third of the horses died trying to negotiate the muddy roads (BRM, 1855, p. 272).

The incapacity of Tsarist regimes to continually keep up and improve road accessibility necessitated that the peasants keep on hand a minimum of one year's crop to be stored in case of harvest failure (Haxthausen, 1856, p. 378). Alexander I ordered storehouses of corn to be constructed in strategic places throughout the Empire (Skrine, 1904, p. 62). Another misery that confronted the poor inhabitants was the so-called podryadchiki (speculators). When roads were out of order in the famine districts, these traveling "businessmen" bought goods in the surplus areas and then carried them to the destitute areas for a large profit (Erman, 1848, vol. 2, p. 107).

Commercial Fairs. The Russian fair system was inspired to promote the local wealth of the countryside rather than for recreation. It was the combination of long distances and poor internal communication facilities that fostered the fairs to take place (CR, 1895, p. 551). In the first decade of the twentieth century, the Russian Empire claimed 16,000 commercial fairs with a turnover of 500 million rubles per annum (Snodgrass, 1913, p. 131). In the Kharkov province alone there were 288 fairs during the mid-nineteenth century (Haxthausen, 1856, vol. 1, p. 410).

In an economy that still considered railways a novelty, the principal fairs were located where the country's high-roads were available (Bookspan, 1918, p. 274). The Tsarist fairs were categorized according to the number of days they were in session: less than seven days, eight to fourteen days, fifteen to twenty days, more than twenty-one days, and thirty days or more. There were summer and winter fairs, trading in every commodity of the countryside (CR, 1895, p. 551). Provinces in the north conducted fairs during the winter so that the snow-roads could be utilized (Snodgrass, 1913, p. 138). From January to March, the acclaimed international fair at Irbit in Siberia was held at the height of winter (RYB, 1913, p. 722).

Traveling the highways to fair events, was admittedly somewhat of an adventure, but the government reminded foreign traders that highwaymen frequently worked so-called "fair-roads" (emphasis added) and little could be done for their protection (London Times, 1879, p. 7). Nevertheless, at the conclusion of the nineteenth century, the Russian government reiterated the importance of internal fairs to the economic well-being of the country, because the state could not provide transportation means on a regular basis (Chancery, 1897, p. 53).

Conclusions

Because weaknesses in road and highway transportation influenced uncoordinated manufacturing methods, Russian industry was pushed into an environment of stress business tactics. Many regions of the country operated separate economies. Prices, wages, and banking methods were contradictory and lopsided. Economies of scale were difficult to maintain when hundreds of isolated mills had to conduct business within a narrow resource base many miles from consuming areas. Rasputitsa and inadequate macadam highways contributed to stagnation and economic recession because

Tsardom was dependent on seasonal land carriage. It was cheaper to import many articles than face slowdowns in manufacturing. The startling fact is that most imported goods could have been obtained in abundance at home.

The geographical distribution of fertile soil contributed to the division of the Empire into agricultural producing and consuming regions. In all cases, paved roads in the Black Earth region were shameful and not reliable enough to carry the nation's rural perishables. The irregularity of opened and closed roads caused large amounts of produce to rot or to remain unsold, thereby causing immense financial harm to the Empire. Because of this condition, the authorities embarked on establishing grain elevators and refrigeration storage facilities.

The periodic conditions of famines were the result of both manmade and natural factors, but roadless Russia was a major situation that prevented food from reaching the stricken regions, or grain to be out of financial reach due to costly land carriage. In order to minimize travel, regional and local commercial fairs were the focal points of buying and selling the products of the country. Russian fairs were a standard barometer of industrial and agricultural productivity, and these fairs remained until the end of Tsardom.

CHAPTER X

SUMMARY AND CONCLUSIONS
TRANSPORTATION GEOGRAPHY AS THE
BASIC PERSPECTIVE

An Overview of the Old Economy

Imperial Russia's transition from an ancien regime to a capitalist society was not facilitated by its road system. This study has attempted to describe the roads of Old Russia--Who built them? Why they were constructed? and What role did they play in the emerging national economy of the nineteenth century?

Transportation geography emphasizes the dynamic, integrative functions of transport modes. As any sizable economic system develops, transportation costs decline, particularly with the construction of a progressively efficient network of roads. The evolution of the Roman Empire and the economy of the United States illustrates the cogent theoretical point that as transportation becomes more and more efficient, regional specialization and interregional trade intensify. In such systems, economic momentum and velocity are largely

accounted for by the ease of commodity movement from region to region. At the apex of development, such a large-scale, spatial economic system was composed of a collection of highly specialized production regions. Simultaneously, on the consumption side of the system, individual behavior becomes more homogenous as the populace was integrated into a singular, interdependent society.

Russian society was faced with the necessity of organizing a massive land area into a national economic system. Water transportation was of minimal assistance, though the rivers and canals of European Russia were important in this regard. Environmental conditions were harsh, making overland travel difficult, expensive, and irregular. Not only was the central government authoritarian, but it was cumbersome and awkwardly bureaucratic. There also was the factor of isolation. No major trade routes carried the flow of people and goods from foreign countries through the Russian state.

In the face of these circumstances, Russia developed a unique variant of the European economic motif. Briefly, this may be characterized as a system that focused on peasant agricultural villages and widely scattered regional trade centers. The summer season was devoted to tilling the land and to food production. The lengthy winter months were devoted to the craft industries, which the kustarnay (handicraft) type is but one example. Each village specialized in the production

of a single item such as knives, candles, nails, and so forth. Such items were marketed in the surrounding region through the services of pedlars or at the trade fairs. The movement of these commodities occurred during the winter months when the ground was frozen and there was no concern for proper roads or bridges. Spring brought the rasputitsa--the time of the mud--after the thaw. All overland movement stopped, and the country was for a period of weeks bezdorozhnost, "without roads." Summer demanded attention for the crops, but the autumn brought another season of mud. Then, across the Russian landscape, winter once again brought the countryside to life, as millions of carts and sledges moved the merchandise of the Empire from place to place. In addition, there were remarkable long-distance movements such as the annual haulage of the Ukrainian wheat crop to St. Petersburg in thousands of small carts and wagons. Similarly, Siberia was served by long-distance cart and sled traffic.

This parochial cycle of seasonal economic activity developed slowly, eventually becoming a central characteristic of Russian culture. Few similar patterns are to be found, for no other culture was faced with the same set of environmental circumstances as Old Russia. This pattern deserved recognition and deeper analysis. It has been

necessary to conceptualize the Russian economy in this fashion in order to understand the overland transportation system of this period.

The revolution in transportation development never came to Russia in the form of sound roads as it did in water and rail construction. Post-roads and public highways were planned and built but not in proportion to the needs of a modernizing country. The Tsarist government was inhibited by the backwardness of the countryside. The low priority assigned to road building had serious, long-range effects.

The lack of agreement between governmental agencies responsible for building roads was due not so much to bureaucratic competition or jealousy but to a narrow view that overland communication was difficult. This was considered to be a given condition of the Russian state. The pervasive attitude reached from the highest points in government down to the ordinary citizens. The consensus was that a quality, well-maintained road system was not a feasible objective.

As in all autocratic governments, a few leaders determined the state's development. In Russia, very few regimes advocated road building programs. One exception was the reign of Nicholas I (1825-1855). The highways, paved and unpaved, built under his auspices were the apex in Russian highway improvement. These reforms in road development

resulted in several thousand miles of modern, well-built paved highways connecting most of the Empire's key urban centers and industrial districts.

This is not to say however that all other governments were derelict in road construction. Many regimes were not enlightened about the benefits of improved roads. A Russian public highway and post-road system gradually evolved to enhance governing, security, and trade. The post-roads were not for daily travel but rather for official purposes. It was very expensive to use the postal-lanes for day-to-day travel. The public highways, on the other hand, were reasonably well-constructed and were generally crowded with the everyday movement of trade and people. The country moved on these thoroughfares. Although not as extensive as post-roads, they were the Empire's most functional system. In a society with such a strict division between the nobility and the peasantry, a system reserved for "official" use was most appropriate.

The typical conveyance on the public highways was a small, sturdy wooden vehicle that carried limited cargo. These were built to withstand rough roads and heavy jolting. Horses were commonly used as draught animals, but all types of domestic beasts worked the roads. Passenger conveyances were also small and springless, making the ride uncomfortable, a feature that did not invite traveling great distances.

Travel was more than an excursion, it was a physically, as well as psychologically, punishing experience. The variety of challenges confronting the drivers and riders caused discomfort, body injury, mental fatigue, and even death.

Over the years, advocates for Russia's road system competed with lobbyists for water and rail transport. In almost every case, believers in new highways found it impossible to convince the authorities. When vast expenditures between water and road construction programs were evaluated, new roads were almost always low on the list or eliminated entirely. The decision to canalize important rivers was made prior to the establishment of a railway-based economy. The roadways also lost in the debate with the railways. Even when state and local agencies provided road engineers with resources and material, road building was a slow process.

Funds for road projects were spent on thoroughfares related to commerce and railroad access. From key rail stations, wagon-roads penetrated the hinterlands. The expansion of railroads rang the death knell for highway construction. From the 1870s on, weatherized roads were too expensive to build or to maintain since land traffic was substantially replaced with steam railways. More than any other factor, new highways came more in response to military concerns than to Russia's changing economic profile.

The automobile industry, which transformed ground circulation in many countries, had little significance in Russia. The motor vehicle was meant to travel over firm, paved highways, but the Empire was poor in this respect. The cart and wagon were not replaced by the soft-tired, passenger car or truck as in other countries. The Russian government continued to rely upon the peasant population for animal draught and cartage until the Revolution of 1917. The fact that motorized transport could offset prodigious distance was ignored.

Impacts of the Russian Physical Environment

Government ministers planned road programs, but the environmental circumstances also played an important role. A real concern that could not be ignored was the pervasive effects of the natural environment on roadways. Regardless of how much emphasis was placed on adding new roads, the severe climate and weather constantly battered the highway network. Many road strategists and highway engineers concluded that it was futile to spend vital resources building stretches of road only to have them obliterated by weather conditions. Pragmatic reasoning prevailed under these circumstances. The environment was too debilitating to the lifespan of the roads. Russia was never able to combat the effects of weather regardless of technology and financial resources.

Because the majority of roads were earthen, the Russians had no choice but to allow their local environment to dictate the roadway conditions. In the calendar year, there were seasons of excellent travel, good travel, poor travel, terrible travel, and no travel. The nemesis of dirt roads was mud. Twice every year, in the spring and again in the fall, the roadways became impassable quagmires. The use of animal-drawn carts and wagons was prohibited by the mud season. The effects of the rasputitsa were accepted as a part of life. Nobility and peasants alike could not escape the inevitable consequences when the roads dissolved into a sea of slippery mud. This was bezdorozhnost, the roadless condition that extracted untold economic and social consequences from Russia. Each settlement became an isolated community. Since towns and villages were isolated from each other for many weeks because of impassable roads, all services were provided internally.

The result of this community isolation was particularly devastating when disease or famine occurred. Millions of people were left to their own resources. Death or starvation was not checked until the roads hardened enough to support travel. In a sense, the rasputitsa had more power than tsars and ministers in the rhythms of the Russian Empire.

The first frost was a welcome relief. Winter was the natural road paver, and the long, deep cold season was considered an important natural resource. The rivers, which were formidable barriers to land travel, were then easily crossed. Distances were shortened considerably by the use of ice-roads. The overall road net was enlarged immeasurably. Bogs and swamps were crossed with ease, as the liquid ground no longer stopped movement.

The Effects of Seasonality and the Russian Economy

The Russian winter was a time of great human activity. The cold brought out millions of conveyances. Because most summer-roads were muddy or badly rutted, drayage was never as great as during the cold months.

The winter season provided fast, efficient, and cheap land carriage opportunities. Sledge-routes were established. Hectic buying and selling among the merchants and industrialists was the rule. To minimize transportation costs, winter brokers accumulated and stored commodities for the next spring. Seasonal roads were important in the industrial realm. Businessmen were aware that the success of their enterprise depended upon winter transportation since land carriage was seldom reliable during the summer. The seasonal rhythm of storage and movement was influential in the day-to-day operation of all mills and factories.

The season of good versus bad roads forced Russian firms to practice autarchy. That is to say, from raw material to the final product, all stages of manufacturing had occurred in a single factory system. Mills had to support separate workshops to maintain an annual equilibrium of output. Because enterprises had to be self-sufficient, it was necessary to own hundreds of square versts of property in order to control the raw materials. An army of extra drivers were employed internally in each factory-system to cart an array of items to and from central factories.

Under such conditions, entrepreneurs were reluctant to commit themselves to long-term expansion. Instead, concentration was on low-risk manufacturing. Only in unusual circumstances did businessmen modernize plant facilities to increase production. They understood that the vagaries of precarious overland cartage might not support such an increase in production. Because many self-contained manufacturing establishments were burdened with unorthodox production procedures, large sums of money were expended on seasonal overland transport. As a consequence, Imperial Russia had to be content with factories that served small market areas.

Seasonality and the Rural Economy. Agriculture was the central industry of nineteenth-century Russia. A close relationship between farming and road transportation was essential.

Many regions contained no roads that were of high standards. Earth-ways zigzagged across the countryside. These roads carried farmers, seeds, grains, produce, and all other country articles. Rural roads were the backbone of interior economic development.

Rural roads were dirt and farmers were calendar watchers. Changes in weather created the tempo of travel. Rasputitsa shut rural commerce for many weeks biannually. Once the roads had dried, drivers tried to move the trade of the countryside. Carts and wagons converged upon the public highways. Traffic jams happened at the outskirts of cities and towns. This, in turn caused city streets to be heavily congested.

The variation in weather conditions in different sections of the country caused industrial and agricultural prices to rise and fall according to transportation costs. Uniform prices and wages were impossible to establish under such conditions. Economic production maintained its parochial Russian character until the era of railway development.

Rural isolation continued to force interior commerce to utilize local and regional trade fairs to dispose of their commodities. Across the country, strategic fair sites arose so the the peasant could sell or buy winter or summer products.

Merchants from all over the Empire traveled from fair to fair to purchase next year's goods. To prepare, pack, and deliver the previous year's merchandise required months or perhaps years.[1]

The carting industry was the undisputed leader when it came to bringing together all the loose ends that arose when rail or water transportation was inept or useless. The professional teamster was not of any one race or nationality although Slavs, Slavic-Jews, and Tatars are singled out as being important in this aspect. Ethnic carters were prevalent in their geographical homelands but were alsc found in small bands outside of their core region. The professional drivers, in many ways, were the unsung heroes when life-threatening situations were avoided or lessened. Commerce and industry could not have functioned without them.

Road Development and Management

Russia demonstrated that great distances and environmental hazards were not absolute deterrents to the evolution of a reasonably successful public highway and post-road

---

[1]The Soviet Union has as many problems with land transportation as their predecessors had. According to a knowledgeable observer of the Soviet economy, "The nation's system of paved roads, linking farms to industrial centers, is as poor as in many developing countries. . ." (Gillette, 1982, p. 13).

network. The streets of most major cities were macadamized, and the state controlled Post-Roads covered most rural regions. The Empire was not at all roadless. It built and maintained, under extreme hardship, a vast system of earth-roads and paved highways of several types. Before the railway era, the burden of internal transportation fell on the ability of the peasant carters and sledge drivers.

The decentralization of road management from the national level to zemstva organizations did little to improve road construction. Technology and funds at that level were limited. The regional road development manifesto in the 1900s divided responsibility among the numerous autonomous communes. Each political entity was concerned with its own territory. Because all finance had to be obtained from a narrow productive base, as many views about road policies emerged as there were zemstvos. This structure of organization prevented a unified national road and highway system from developing. What local road committees did accomplish, however, was the laying out of rural trade routes (farm to market). Interregional land transportation was not facilitated by the local government's policy of responsibility for road construction.

Specific Conclusions

(1) The term roadlessness (bezdorozhnost) does not adequately characterize the Russian state. There were various

types of public highways and post-roads available except during the periods of rasputitsa.

(2) Harsh weather was a major factor that caused land travel to be difficult or impossible. Yearly, roads were out of commission for many weeks. Villages were isolated until the thoroughfares dried. Roadlessness came from the seasonal deterioration of roads and highways and not from the lack of routes.

(3) Surplus labor was substituted for capital investment to provide the Empire's land transportation requirements. The circulatory system was very labor intensive in comparison with the road systems of other European states.

(4) The development of railroads resulted in the abandonment of efforts by the government to build more new highways.

(5) The state, for a variety of reasons, was unsympathetic to the critical role of land transport in the process of modernization. This lack of understanding was a significant impediment to economic growth, political integration, and the social awareness of a major nation-state.

(6) The economy was focused on village industries (kustarnay) because no transportation was available that allowed for regional specialization to develop. This eventually became possible when railways were built.

(7) With labor in abundance and the costs of highway construction exorbitant, Russian road engineers adopted the obsolete macadam process of road construction, the cheapest method of road making.

(8) Paved highways were not extensive because of Russia's surface geology. Hard rock was essential for macadam roads, and it had to be carried long distances from the source regions at great expense.

(9) Earth-roads and the effects of rasputitsa inhibited the use of the motor car in the Russian Empire. Only in major urban centers were automobiles and trucks to be found.

(10) The immense system of meandering streams and broad rivers prevented the building of good, solid bridges. Water spans were few and travel was restricted to these bridges.

Postscript

In opulence and glittering splendor, Imperial Russia was "dressed to kill," but the nobility was a poor teacher when it came to fashioning a road network. The country developed surroundings that were somewhat "Janus-like." The neglect of the road system was a response to the environment, but there were also other factors that denied the citizenry good roads. The no-roads policy was unenlightened, a characteristic that was typical of Tsarist Russia. The government in

St. Petersburg never conceded to a balance between road construction and other forms of transportation.

The causes and effects, symptoms and consequences of the road policies were intertwined. The Eurasian Empire was strapped with environmental liabilities--in particular, distance and climate. "Good roads" never became a national concept. In such a milieu, highway efficiency did not develop as it might have. The rasputitsa season anchored the life rhythms of the country, and patience became a great solace. The purposeful neglect, or the casual inattention to building and maintaining roads, seems to have been a long-term characteristic of Russian (and Soviet) society.

APPENDIX A

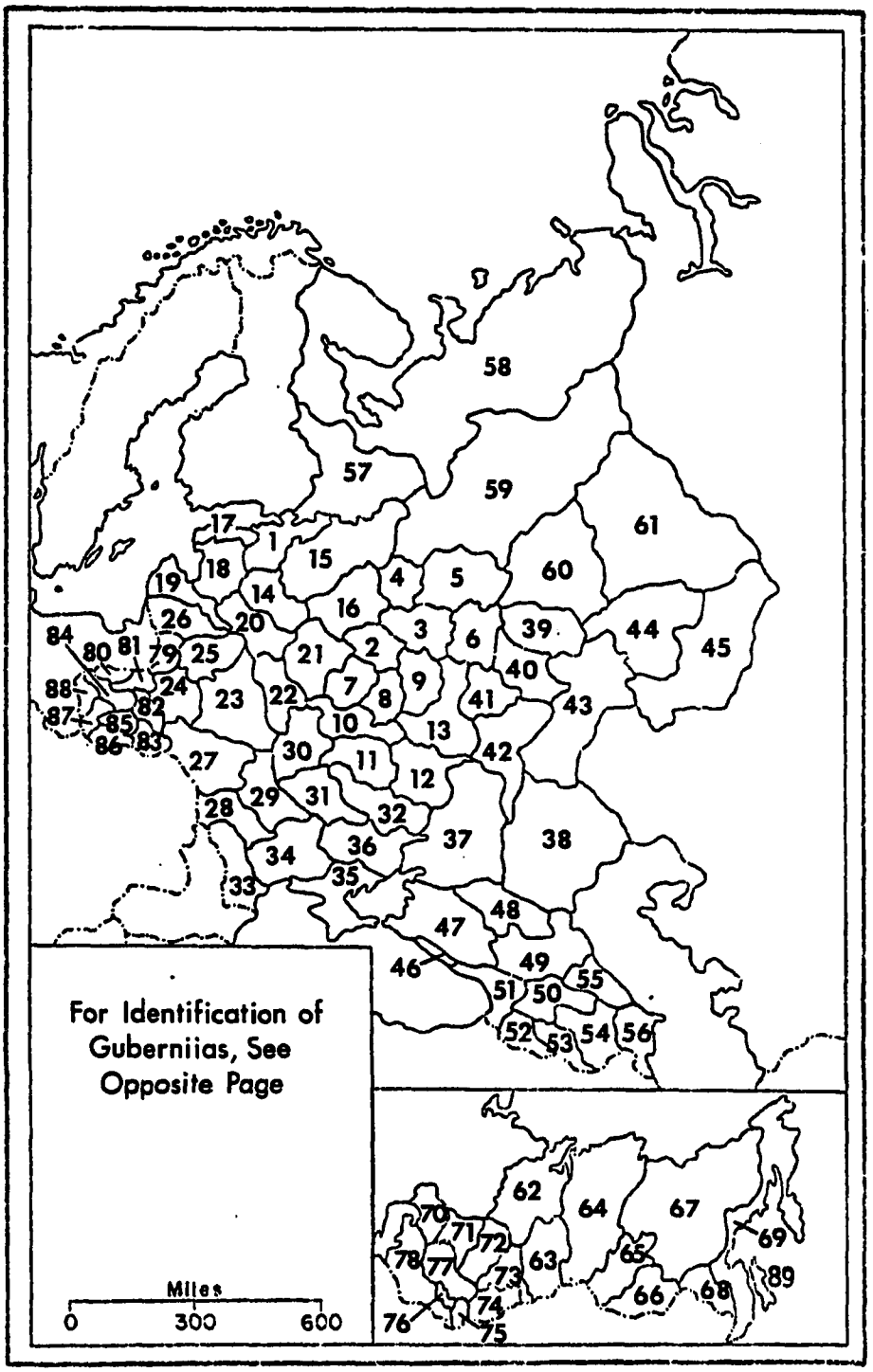
NAMES OF GUBERNIIAS

1.	St. Petersburg	40.	Simbirsk	79.	Suwalki
2.	Moscow	41.	Penza	80.	Plock
3.	Vladimir	42.	Saratov	81.	Lomza
4.	Yaroslavl	43.	Samara	82.	Siedlce
5.	Kostroma	44.	Ufa	83.	Lublin
6.	Nizhni-Novgorod	45.	Orenburg	84.	Warsaw
7.	Kaluga	46.	Chernomorsk	85.	Radom
8.	Tula	47.	Kuban	86.	Kielce
9.	Riazan	48.	Stavropol	87.	Piotrkow
10.	Orel	49.	Terek	88.	Kalisz
11.	Kursk	50.	Tiflis	89.	Sakhalin
12.	Voronezh	51.	Kutais		
13.	Tambov	52.	Kars		
14.	Pskov	53.	Erivan		
15.	Novgorod	54.	Elisavetpol		
16.	Tver	55.	Dagestan		
17.	Estland	56.	Baku		
18.	Lifland	57.	Olonets		
19.	Kurland	58.	Archangel		
20.	Vitebsk	59.	Vologda		
21.	Smolensk	60.	Viatka		
22.	Mogilev	61.	Perm		
23.	Minsk	62.	Tobolsk		
24.	Grodno	63.	Tomsk		
25.	Vilna	64.	Enisei		
26.	Kovno	65.	Irkutsk		
27.	Volyhnia	66.	Zabaikal		
28.	Podolia	67.	Yakutsk		
29.	Kiev	68.	Amur		
30.	Chernigov	69.	Primorsk		
31.	Poltava	70.	Uralsk		
32.	Kharkov	71.	Turgai		
33.	Bessarabia	72.	Akmolinsk		
34.	Kherson	73.	Semipalatinsk		
35.	Tavrida	74.	Semireche		
36.	Ekaterinoslav	75.	Ferghana		
37.	Don	76.	Samarkand		
38.	Astrakhan	77.	Syr Daria		
39.	Kazan	78.	Zakaspisk		

NOTE: Finland, Bukhara, and Khiva are not included.

Appendix A (cont.)

GUBERNIIAS OF THE RUSSIAN EMPIRE, 1910



SOURCE: Tsentralnyi statisticheskii komitet. Vols. 1-89. St. Petersburg, 1899-1904.

APPENDIX B

WAGE EARNERS EMPLOYED IN THE RUSSIAN CARRIAGE CONSTRUCTION INDUSTRY BY PROVINCE AND REGIONS, 1897*

Province and Region	Wage Earners		Member of Household	
	Male	Female	Male	Female
Agricultural Center				
1. Kursk	101	3	86	143
2. Orel	107	--	60	134
3. Riazan	85	--	36	73
4. Tambov	174	3	137	243
5. Tula	71	--	31	69
6. Voronezh	138	--	121	195
TOTAL	676	6	471	857
Middle Volga				
7. Kazan	220	--	84	165
8. Nizhni-Novgorod	508	5	308	664
9. Penza	58	--	30	59
10. Saratov	142	1	78	149
11. Simbirsk	49	--	39	70
12. Ufa	151	2	80	108
TOTAL	1,128	8	629	1,215
Lower Volga				
13. Astrakhan	140	1	35	87
14. Orenburg	92	2	78	201
15. Samara	68	--	45	104
TOTAL	300	3	158	392
New Russia				
16. Bessarabia	130	--	80	143
17. Don	229	--	134	277
18. Ekaterinoslav	103	--	50	115
19. Kherson	641	--	298	617
20. Taurida	299	4	195	395
TOTAL	1,402	4	757	1,547

*Includes building wooden vessels.

APPENDIX B (cont.)

Province and Region	Wage Earners		Member of Household	
	Male	Female	Male	Female
Southwest				
21. Kiev	157	1	112	219
22. Podolia	105	--	78	108
23. Volyhnia	68	4	65	115
TOTAL	330	5	255	442
Little Russia				
24. Chernigov	146	--	93	241
25. Kharkov	142	--	84	153
26. Poltava	66	--	40	75
TOTAL	354	--	217	469
Industrial Center				
27. Kaluga	50	3	42	65
28. Kostroma	178	1	21	52
29. Moscow	1,615	12	391	774
30. Tver	217	4	117	180
31. Vladimir	147	1	79	164
32. Yaroslavl	807	4	256	381
TOTAL	3,014	25	906	1,616
White Russia				
33. Minsk	90	--	43	102
34. Mogilev	20	1	22	29
35. Smolensk	41	--	28	48
36. Vitebsk	44	24	25	114
TOTAL	195	25	118	293
Lithuania				
37. Grodno	38	--	23	59
38. Vilna	100	2	40	80
39. Kovno	56	--	39	71
TOTAL	194	2	102	210

APPENDIX B (cont.)

Province and Region	Wage Earners		Member of Household	
	Male	Female	Male	Female
Lithuania				
37. Grodno	38	--	23	59
38. Vilna	100	2	40	80
39. Kovno	56	--	39	71
TOTAL	194	2	102	210
Lake				
40. Novgorod	1,674	--	133	239
41. Olonets	17	1	--	--
42. St. Petersburg	1,569	9	457	975
43. Pskov	35	--	28	62
TOTAL	3,295	10	618	1,276
Ural				
44. Perm	534	--	431	854
45. Viatka	132	1	43	77
TOTAL	666	1	474	931
Baltic				
46. Kurland	67	1	40	75
47. Kifland	616	1	256	604
48. Estland	90	3	28	63
TOTAL	773	5	324	742
North				
49. Archangel	40	--	24	75
50. Vologda	139	--	14	23
TOTAL	179	--	38	98
Russian Poland				
51. Kalisz	14	1	8	23
52. Kielce	10	--	2	7
53. Lomza	9	--	5	19
54. Lublin	38	--	14	32
55. Radom	28	--	6	17
56. Piotrkow	47	--	32	54

APPENDIX B (cont.)

Province and Region	Wage Earner		Member of Household	
	Male	Female	Male	Female
Russian Poland (cont.)				
57. Plock	47	--	35	100
58. Suwalki	3	--	5	11
59. Siedlce	8	--	1	11
60. Warsaw	230	2	112	292
TOTAL	434	4	220	566
Transcaucasus				
61. Baku	81	1	42	86
62. Chernomorsk	16	--	10	13
63. Dagestan	14	--	5	14
64. Kars	1	--	10	10
65. Kuban	85	5	88	131
66. Kutais	118	--	69	103
67. Stavropol	17	--	12	19
68. Terek	29	--	23	50
69. Tiflis	240	1	72	139
70. Erivan	21	--	18	25
71. Elizavetpol	32	--	15	44
TOTAL	654	7	364	634
Central Asia				
72. Akmolinsk	15	--	16	27
73. Zakaspisk	17	--	10	15
74. Samarkand	26	--	18	36
75. Semipalatinsk	12	--	7	14
76. Semereche	10	--	11	21
77. Syr Daria	10	--	7	16
78. Turgai	2	--	--	1
79. Uralsk	15	--	14	25
80. Ferghana	10	--	12	12
TOTAL	117	--	95	167
Western Siberia				
81. Enisei	23	--	17	21
82. Tobolsk	55	2	27	67
83. Tomsk	90	1	64	121
TOTAL	168	3	108	209

APPENDIX B (cont.)

Province and Region	Wage Earner		Member of Household	
	Male	Female	Male	Female
Eastern Siberia				
84. Zabaikal	9	--	5	11
85. Irkutsk	32	--	27	46
86. Yakutsk	1	--	--	--
TOTAL	42	--	32	57
Far East				
87. Amur	17	--	16	27
88. Sakhalin	4	--	--	1
89. Primorsk	381	--	37	54
TOTAL	402	--	53	82
Total by Regions				
1. Agricultural Center	676	6	471	857
2. Middle Volga	1,128	8	619	1,215
3. Lower Volga	300	3	158	392
4. New Russia	1,402	4	757	1,547
5. Southwest	330	5	255	442
6. Little Russia	354	--	217	469
7. Industrial Center	3,014	25	906	1,616
8. White Russia	195	25	118	293
9. Lithuania	194	2	102	210
10. Lake	3,295	10	618	1,276
11. Ural	666	1	474	931
12. Baltic	773	5	324	742
13. North	179	--	38	98
14. Russian Poland	434	4	220	566
15. Transcaucasus	654	7	364	634
16. Central Asia	117	--	95	167
17. Western Siberia	168	3	108	209
18. Eastern Siberia	42	--	32	57
19. Far East	402	--	53	82
TOTAL	14,323	108	5,929	11,803

SOURCE: Compiled from Tsentralnyi statisticheskii komitet. Pervaia vseobshchaia perepis naselniia Rossiiskoi Imperii 1897, g. Volumes 1-89. St. Petersburg, 1899-1904.

*Includes building wooden vessels.

APPENDIX C

WORKERS IN ZEMSTVO FREE POST BY REGIONS AND PROVINCE, 1897

Regions and Province	NUMBER EMPLOYED	
	Male	Female
Agricultural		
1. Kursk	117	--
2. Orel	98	--
3. Riazan	82	--
4. Tambov	427	1
5. Tula	47	1
6. Voronezh	356	3
Total	1,127	5
Middle Volga		
7. Kazan	370	--
8. Nizhni-Novgorod	318	4
9. Penza	258	5
10. Saratov	468	1
11. Simbirsk	344	--
12. Ufa	217	3
Total	1,975	13
Lower Volga		
13. Astrakhan	86	--
14. Orenburg	278	1
15. Samara	478	--
Total	842	1
New Russia		
16. Bessarabia	183	2
17. Don	246	--
18. Ekaterinoslav	203	--
19. Kherson	212	--
20. Taurida	117	5
Total	961	7

APPENDIX C (cont.)

Regions and Province	NUMBER EMPLOYED	
	Male	Female
Southwest		
21. Kiev	77	1
22. Podolia	159	--
23. Volyhnia	90	1
Total	326	2
Little Russia		
24. Chernigov	36	--
25. Kharkov	167	--
26. Poltava	95	2
Total	298	2
Industrial		
27. Kaluga	25	--
28. Kostroma	188	2
29. Moscow	72	--
30. Tver	189	--
31. Vladimir	72	--
32. Yaroslavl	46	--
Total	592	2
White		
33. Minsk	90	--
34. Mogilev	62	--
35. Smolensk	69	--
36. Vitebsk	67	--
Total	288	--
Lithuania		
37. Grodno	36	--
38. Vilna	7	--
39. Kovno	39	--
Total	82	--

APPENDIX C (cont.)

Regions and Province	NUMBER EMPLOYED	
	Male	Female
Lake		
40. Novgorod	334	3
41. Olonets	268	--
42. St. Petersburg	67	--
43. Pskov	56	--
Total	725	3
Ural		
44. Perm	642	--
45. Viatka	869	--
Total	1,511	--
Baltic		
46. Kurland	8	--
47. Lifland	18	--
48. Estland	18	--
Total	44	--
Russian Poland		
51. Warsaw	2	--
52. Kalisz	7	--
53. Kielce	5	--
54. Lomza	--	--
55. Lublin	9	--
56. Piotrkow	--	--
57. Plock	2	--
58. Radom	3	--
59. Suwalki	4	--
60. Siedlce	4	--
Total	36	--
Transcaucasus		
61. Baku	12	--
62. Dagestan	16	--
63. Elizavetpol	24	--
64. Kars	1	--

APPENDIX C (cont.)

Regions and Province	NUMBER EMPLOYED	
	Male	Female
Transcaucasus (cont.)		
65. Kuban	139	--
66. Kutais	10	--
67. Stavropol	78	1
68. Terek	30	--
69. Tiflis	21	--
70. Chernomorsk	--	--
71. Erivan	32	--
Total	363	1
Central Asia		
72. Akmoslinsk	126	--
73. Zakaspisk	--	--
74. Samarkand	--	--
75. Semipalatinsk	151	--
76. Semiriche	35	--
77. Syr Daria	--	--
78. Turgai	20	--
79. Uralsk	20	--
80. Ferghana	9	--
Total	361	--
West Siberia		
81. Enisei	354	9
82. Tobolsk	932	2
83. Tomsk	678	2
Total	1,964	13
East Siberia		
84. Irkutsk	3,312	62
85. Yakutsk	489	4
86. Zabaikal	463	4
Total	4,264	70

APPENDIX C (cont.)

Regions and Province	NUMBER EMPLOYED	
	Male	Female
Far East		
87. Amur	164	--
88. Primorsk	65	--
89. Sakhalin	--	--
Total	229	--
GRAND TOTAL	17,153	121

SOURCE: Tsentralnyi statisticheskii komitet.

APPENDIX D

DIRECTORS AND MINISTERS OF ROADS AND HIGHWAYS

Superintendent of Waterways--1797

1797-1800	Count Jacob Johann Sievers
1801-1809	Count Nikolai Petrovich Rumiantsev
1809-1812	Prince George Paul Oldenburg
1812-1818	Francois Devolent (Belgium)
1819-1823	Augustine de Bethancourt (Spain)
1824-1832	Alexander Frederick, Duke of Wurttemburg (Germany)
1833-1842	General Karl Toll
1842-1855	Count P. A. Kleinmikel
1855-	General K. V. Chevkin

Minister of Ways of Communication--1865

1862-1869	General Paul P. Melnikov
1869-1871	Major Gen. Count V. A. Bobrinsky
1871-1874	Lt. Gen. Count A. P. Bobrinsky
1874-1888	Rear Admiral C. Possiet
1888-1889	Lt. Gen. G. E. Pauker
1889-1889	A. Ia. von Hubbenet
1889-1891	General Annenkov
1891-1892	Krivoshiem
1892	S. Iu. Witte
1895-1905	Prince Mikhail J. Khilkov
1905-1906	Dr. K. S. Nemeshaev
1906-1909	General N. K. Schaffhausen
1909-1915	S. V. Rukhlov
1915-1917	General A. F. Trepov
1917	N. V. Nekrasov

SOURCES: Almedinger, 1962, p. 118; Blackwell, 1974, pp. 264-78; Pares, 1939, p. 525; Treadgold, 1957, p. 259; Statesman's Year-Book, 1865, p. 390; 1870, p. 359; 1874, p. 355; 1875, p. 355; 1889, p. 415; 1890, p. 841; 1892, p. 855; 1893, p. 855; 1896, p. 855; 1906, p. 1310; 1907, p. 1372; 1911, p. 1147; 1916, p. 1278; 1817, p. 1226.

APPENDIX E

RURAL ADMINISTRATION EXPENDITURE FOR EUROPEAN RUSSIA, 1894 (excluding Russian Poland)

IN RUBLES

	PROVINCE	Ways of Communication		PROVINCE	Ways of Communication
1.	Archangel		9.	Voronezh	
	Volost	27,042		Volost	2,581
	Selo	23,757		Selo	36,597
	Total	50,799		Total	39,178
2.	Astrakhan		10.	Viatka	
	Volost	4,913		Volost	5,970
	Selo	9,013		Selo	6,351
	Total	13,926		Total	12,321
3.	Bessarabia		11.	Grodno	
	Volost	9,049		Volost	1,405
	Selo	17,603		Selo	3,061
	Total	26,652		Total	4,466
4.	Vilna		12.	Don	
	Volost	16,209		Volost	18,335
	Selo	1,520		Selo	10,231
	Total	17,729		Total	28,566
5.	Vitebsk		13.	Ekaterinoslav	
	Volost	15,430		Volost	1,617
	Selo	14,457		Selo	26,945
	Total	29,887		Total	28,652
6.	Vladimir		14.	Kazan	
	Volost	1,321		Volost	1,240
	Selo	39,993		Selo	42,696
	Total	41,314		Total	43,936
7.	Vologda		15.	Kaluga	
	Volost	13,684		Volost	1,525
	Selo	10,891		Selo	13,963
	Total	24,575		Total	15,488
8.	Volhynia		16.	Kiev	
	Volost	2,202		Volost	1,100
	Selo	4,604		Selo	11,186
	Total	6,806		Total	12,286

APPENDIX E (cont.)

IN RUBLES

	PROVINCE	Ways of Communication		PROVINCE	Ways of Communication
17.	Kovno		25.	Nizhni-Novgorod	
	Volost	748		Volost	8,222
	Selo	258		Selo	27,160
	Total	1,006		Total	35,382
18.	Kostroma		26.	Novgorod	
	Volost	5,930		Volost	2,890
	Selo	6,539		Selo	15,888
	Total	12,469		Total	18,778
19.	Kourland		27.	Olonets	
	Volost	720		Volost	2,591
	Selo	---		Selo	4,481
	Total	720		Total	7,072
20.	Kursk		28.	Orenburg	
	Volost	162		Volost	3,603
	Selo	17,239		Selo	12,821
	Total	17,401		Total	16,424
21.	Lifland		29.	Orel	
	Volost	11,680		Volost	67
	Selo	---		Selo	23,821
	Total	11,680		Total	23,888
22.	Minsk		30.	Penza	
	Volost	5,637		Volost	1,378
	Selo	640		Selo	23,983
	Total	6,277		Total	25,361
23.	Mogilev		31.	Perm	
	Volost	2,014		Volost	9,588
	Selo	16,249		Selo	16,666
	Total	18,263		Total	26,254
24.	Moscow		32.	Podolia	
	Volost	565		Volost	267
	Selo	48,472		Selo	10,876
	Total	49,037		Total	11,143

APPENDIX E (cont.)

IN RUBLES

	PROVINCE	Ways of Communication		PROVINCE	Ways of Communication
33.	Poltava		41.	Taurida	
	Volost	1,921		Volost	268
	Selo	14,554		Selo	63,934
	Total	16,475		Total	64,202
34.	Pskov		42.	Tambov	
	Volost	4,874		Volost	1,375
	Selo	7,168		Selo	37,290
	Total	12,042		Total	38,665
35.	Riazan		43.	Tver	
	Volost	2,974		Volost	686
	Selo	36,197		Selo	17,081
	Total	39,171		Total	17,767
36.	Samara		44.	Tula	
	Volost	1,277		Volost	1,138
	Selo	57,836		Selo	14,577
	Total	59,113		Total	15,715
37.	St. Petersburg		45.	Ufa	
	Volost	6,370		Volost	9,394
	Selo	26,066		Selo	31,173
	Total	32,436		Total	40,567
38.	Saratov		46.	Kharkov	
	Volost	2,727		Volost	451
	Selo	38,966		Selo	21,777
	Total	41,693		Total	22,228
39.	Simbirsk		47.	Kherson	
	Volost	158		Volost	4,003
	Selo	29,676		Selo	34,772
	Total	29,834		Total	38,775
40.	Smolensk		48.	Chernigov	
	Volost	8,524		Volost	---
	Selo	9,733		Selo	9,242
	Total	18,257		Total	9,242

APPENDIX E (cont.)

	PROVINCE	In Rubles Ways of Communication		PROVINCE	Ways of Communication
49.	Estland		50.	Yaroslavl	
	Volost	843		Volost	1,393
	Selo	---		Selo	10,620
	Total	843		Total	12,013

TOTAL 50 PROVINCES	
Volost	228,061
Selo	958,505
TOTAL	1,186,684

SOURCE: Statistika Rossiiskoi Imperii. Sbornik Svedenii Po Rossii, 1896. Volume XL. Tablitsa CXXXII, pp. 302-09. Tsentralni statisticheskii komitet. Ministerstva vnutrennikh del. St. Petersburg, 1897.

APPENDIX F

WORKERS IN CONSTRUCTION AND MAINTENANCE OF HIGHWAYS, STREETS, AND BRIDGES BY PROVINCE AND GEOGRAPHICAL REGIONS, 1897

PROVINCE	Building/Repairing Highways, Streets, and Bridges				Maintenance of Roads, Streets and Bridges			
	Wage Earners		Member of Household		Wage Earner		Member of Household	
	M	F	M	F	M	F	M	F
Agricultural								
1. Kursk	14	--	17	--	5	--	5	--
2. Orel	43	--	26	--	4	--	2	--
3. Riazan	48	--	30	2	12	--	2	--
4. Tambov	5	--	1	--	6	--	3	--
5. Tula	30	--	15	--	8	--	1	--
6. Voronezh	2	--	3	--	1	--	--	--
Total	142	--	92	2	36	--	13	--
Middle Volga								
7. Kazan	74	--	94	--	2	--	--	--
8. Nizhni-Novgorod	12	--	6	--	9	--	2	--
9. Penza	2	--	--	--	1	--	--	--
10. Saratov	1	--	2	--	3	--	--	--
11. Simbirsk	1	--	--	--	7	--	--	--
12. Ufa	--	--	--	--	7	--	5	--
Total	90	--	102	--	29	--	7	--
Lower Volga								
13. Astrakhan	--	--	--	--	--	--	--	--
14. Orenburg	--	--	--	--	--	--	--	--
15. Samara	2	--	--	--	88	--	--	--
Total	2	--	--	--	88	--	--	--

APPENDIX F (cont.)

Province	Building/Repairing Highways, Streets, and Bridges				Maintenance of Roads, Streets, and Bridges			
	Wage Earner		Member of Household		Wage Earner		Member of Household	
	M	F	M	F	M	F	M	F
New Russia								
16. Bessarabia	--	--	--	--	5	--	--	--
17. Don	--	--	--	--	--	--	--	--
18. Ekaterinoslov	8	--	--	--	10	--	--	--
19. Kherson	1	--	--	--	--	--	--	--
20. Tavrida	1	--	--	--	4	--	1	--
Total	10	--	--	--	36	--	15	--
Southwest								
21. Kiev	21	--	5	--	3	--	2	--
22. Podolia	17	--	1	--	14	--	2	--
23. Volyhnia	26	--	7	--	7	--	3	1
Total	64	--	13	--	24	--	7	1
Little Russia								
24. Chernigov	4	--	2	--	4	--	1	--
25. Kharkov	--	--	--	--	--	--	--	--
26. Poltava	--	--	--	--	1	--	--	--
Total	4	--	2	--	5	--	1	--
Industrial								
27. Kaluga	187	--	242	2	129	2	143	1
28. Kostroma	5	--	1	--	--	--	--	--
29. Moscow	20	--	3	--	8	--	8	--
30. Tver	126	--	79	--	31	--	20	--
31. Vladimir	--	--	1	--	44	--	11	--
32. Yaroslavl	88	--	45	--	2	--	2	--
Total	426	--	371	2	214	2	184	1

APPENDIX F (cont.)

PROVINCE	Building/ Repairing Highways, Streets, and Bridges				Maintenance of Roads, Streets, and Bridges			
	Wage Earners		Member of Household		Wage Earner		Member of Household	
	M	F	M	F	M	F	M	F
White								
33. Minsk	4	--	--	--	1	--	--	--
34. Mogilev	24	--	23	--	12	--	31	--
35. Smolensk	209	--	249	--	--	--	--	--
36. Vitebsk	18	--	33	--	11	--	4	--
Total	255	--	305	--	24	--	35	--
Lithuania								
37. Grodno	13	--	5	18	16	--	14	--
38. Vilna	3	--	--	--	3	--	16	--
39. Kovno	5	--	1	--	--	--	--	--
Total	21	--	6	18	19	--	30	--
Lake								
40. Novgorod	82	--	44	5	20	--	1	--
41. Olonets	--	--	--	--	8	--	3	--
42. St. Peters-burg	27	--	19	--	180	--	237	1
43. Pskov	6	--	--	--	14	--	5	--
Total	115	--	63	5	222	--	246	1
Ural								
44. Perm	8	--	2	--	503	--	19	--
45. Viatka	13	--	3	--	19	--	7	--
Total	21	--	5	--	522	--	26	--

APPENDIX F (cont.)

Province	Building/Repairing Highways, Streets and Bridges				Maintenance of Roads, Streets, and Bridges			
	Wage Earners		Member of Household		Wage Earner		Member of Household	
	M	F	M	F	M	F	M	F
Baltic								
46. Kurland	4	--	--	--	--	--	--	--
47. Lifland	6	--	1	--	8	--	4	--
48. Estland	--	--	--	--	--	--	--	--
Total	10	--	1	--	8	--	4	--
North								
49. Archangel	--	--	--	--	15	--	2	--
50. Vologda	102	--	--	--	2	--	3	--
Total	102	--	--	--	17	--	5	--
Russian Poland								
51. Warsaw	6	--	3	1	33	--	3	--
52. Kalisz	4	--	--	--	9	--	--	--
53. Kielce	7	--	5	--	11	--	1	--
54. Lomza	3	--	--	--	--	--	--	--
55. Lublin	2	--	1	--	21	--	9	--
56. Piotrkow	4	--	--	--	31	--	1	--
57. Plock	--	--	--	--	--	--	--	--
58. Radom	10	--	2	--	8	--	1	--
59. Suwalki	--	--	--	--	15	--	1	--
60. Siedlce	1	--	--	--	14	1	2	--
Total	37	--	11	1	142	1	18	--
Transcaucasus								
61. Baku	--	--	--	--	--	--	--	1
62. Dagestan	6	--	--	--	--	--	--	--
63. Elisavetpol	3	--	1	--	--	--	--	--
64. Kars	--	--	--	--	2	--	--	--
65. Kuban	6	--	--	--	6	--	--	--
66. Kutais	2	--	1	--	3	--	1	--
67. Stavropol	--	--	--	--	1	--	--	--
68. Terek	--	--	--	--	--	--	--	--

APPENDIX F (cont.)

Province	Building/Repairing Highways, Streets, and Bridges				Maintenance of Roads, Streets, and Bridges			
	Wage Earners		Member of Household		Wage Earner		Member of Household	
	M	F	M	F	M	F	M	F
Transcausasus (cont.)								
69. Tiflis	--	--	--	--	1	--	8	--
70. Chernomorsk	1	--	--	--	1	--	--	--
71. Erivan	4	--	1	--	2	--	2	--
Total	22	--	3	--	15	--	13	1
Central Asia								
72. Akmolinsk	--	--	--	--	--	--	--	--
73. Zakaspisk	--	--	--	--	--	--	1	--
74. Samarkand	3	--	--	--	1	--	--	--
75. Semipalatinsk	--	--	--	--	2	--	--	--
76. Semiriche	--	--	--	--	--	--	--	--
77. Syr Daria	--	--	--	--	--	--	--	--
78. Turgai	--	--	--	--	--	--	--	--
79. Uralsk	--	--	--	--	--	--	--	--
80. Ferghana	--	--	--	--	--	--	--	--
Total	3	--	--	--	3	--	1	--
West Siberia								
81. Enisei	2	--	--	--	1	--	--	--
82. Tobolsk	--	--	--	--	4	--	2	--
83. Tomsk	1	--	--	--	1	--	--	--
Total	3	--	--	--	6	--	2	--
East Siberia								
84. Irkutsk	5	--	1	--	3	--	--	--
85. Yakutsk	--	--	--	--	--	--	--	--
86. Zabaikal	--	--	--	--	--	--	--	--
Total	5	--	1	--	--	--	--	--

APPENDIX F (cont.)

Province	Building/Repairing Highways, Streets, and Bridges				Maintenance of Roads, Streets, and Bridges			
	Wage Earners		Member of Household		Wage Earner		Member of Household	
	M	F	M	F	M	F	M	F
Far East								
87. Amur	--	--	--	--	--	--	--	--
88. Primorsk	--	--	--	--	--	--	--	--
89. Sakhalin	--	--	--	--	--	--	--	--
Total	--	--	--	--	--	--	--	--
GRAND TOTAL	1,332	--	1,077	28	1,410	3	507	4

SOURCE: Tsentralnyi statisticheskii komitet. Pervaia vseobshchaia perepis naseleniia Rosskii Imperii 1897 g. Volumes 1-89. St. Petersburg, 1899-1904.

APPENDIX G

WAGE EARNERS EMPLOYED IN THE RUSSIAN TRANSPORTATION AND COMMUNICATION INDUSTRY, 1897

REGION	CARTER	RAIL	WATER	POST
A. BLACK EARTH ZONE				
Agricultural Center				
1. Kursk	1,189	4,842	25	158
2. Orel	2,534	7,021	135	741
3. Riazan	4,083	4,496	421	556
4. Tambov	2,085	8,227	440	874
5. Tula	1,512	4,437	52	476
6. Voronezh	2,131	6,427	45	602
REGIONAL TOTAL	13,534	35,450	1,118	3,407
Middle Volga				
7. Kazan	2,828	418	1,072	604
8. Nizhni-Novgorod	5,011	1,212	8,088	593
9. Penza	1,150	2,498	35	378
10. Saratov	5,732	7,250	1,480	986
11. Simbirsk	2,820	1,347	1,454	340
12. Ufa	1,964	2,819	299	307
REGIONAL TOTAL	19,505	15,544	12,428	3,208
Lower Volga				
13. Astrakhan	3,919	192	5,715	243
14. Orenburg	5,976	2,186	64	339
15. Samara	3,847	4,968	325	691
REGIONAL TOTAL	13,742	7,346	6,104	1,273
New Russia				
16. Bessarabia	3,469	2,537	352	672
17. Don	8,232	9,620	1,661	1,152
18. Ekaterinoslav	4,554	12,577	804	1,085
19. Kherson	10,283	6,919	4,293	1,392
20. Taurida	5,069	2,997	2,964	735
REGIONAL TOTAL	32,507	34,650	10,074	5,036

APPENDIX G (cont.)

REGION	CARTER	RAIL	WATER	POST
Southwest				
21. Kiev	9,699	6,066	926	906
22. Podolia	3,453	3,152	89	982
23. Volhynia	4,624	3,806	42	723
REGIONAL TOTAL	17,776	13,024	1,057	2,611
Little Russia				
24. Chernigov	4,176	4,570	390	591
25. Kharkov	4,067	8,678	80	1,117
26. Poltava	3,826	2,833	539	596
REGIONAL TOTAL	12,069	16,081	1,009	2,304
TOTAL FOR BLACK EARTH	109,133	122,095	31,790	17,839
B. NON-BLACK EARTH ZONE				
Industrial Center				
27. Kaluga	1,842	2,824	89	364
28. Kostroma	1,870	401	1,570	327
29. Moscow	38,784	15,002	178	3,077
30. Tver	2,339	2,685	1,816	548
31. Vladimir	3,107	3,818	1,463	556
32. Yaroslavl	3,086	2,784	2,036	557
REGIONAL TOTAL	51,028	27,514	7,152	5,429
White Russia				
33. Minsk	6,229	6,066	926	906
34. Mogilev	2,781	2,728	533	508
35. Smolensk	1,575	4,100	29	558
36. Vitebsk	3,318	4,607	364	555
REGIONAL TOTAL	13,903	17,501	1,852	2,527

APPENDIX G (cont.)

REGION	CARTER	RAIL	WATER	POST
Lithuania				
37. Grodno	3,597	4,260	155	679
38. Vilna	3,837	4,139	133	725
39. Kovno	3,630	2,020	207	440
REGIONAL TOTAL	13,903	17,501	1,852	2,527
Lake				
40. Novgorod	2,554	3,900	1,865	531
41. Olonets	930	57	1,383	94
42. St. Petersburg	37,042	10,846	2,522	3,824
43. Pskov	687	1,026	110	275
REGIONAL TOTAL	41,213	15,829	5,880	4,724
Ural				
44. Perm	18,375	7,304	1,169	794
45. Viatka	3,381	400	2,646	341
REGIONAL TOTAL	21,756	7,704	3,815	1,136
Baltic				
46. Kurland	1,652	1,943	1,518	482
47. Livonia	4,907	3,936	2,220	944
48. Estland	1,527	1,700	1,098	271
REGIONAL TOTAL	8,086	7,579	4,836	1,697
Northern				
49. Archangel	1,503	233	1,586	217
50. Vologda	888	781	552	234
REGIONAL TOTAL	2,391	1,014	2,138	451
TOTAL NON-BLACK EARTH	149,441	87,560	26,168	17,807
TOTAL EUROPEAN RUSSIA	258,574	209,655	57,958	35,646

APPENDIX G (cont.)

REGION	CARTER	RAIL	WATER	POST
Russian Poland				
51. Warsaw	8,750	8,870	444	438
52. Kalisz	1,152	24	31	1,438
53. Kielce	731	822	7	199
54. Lomza	1,012	557	333	169
55. Lublin	1,439	245	50	292
56. Piotrkow	3,617	4,579	25	499
57. Plock	537	312	106	127
58. Radom	1,190	1,307	63	199
59. Suwalki	879	645	70	199
60. Siedlce	1,375	1,055	27	190
REGIONAL TOTAL	20,691	18,416	1,156	3,450
Transcaucasus				
61. Baku	5,739	1,653	3,014	363
62. Dagestan	770	366	285	129
63. Elizavetpol	1,475	1,477	15	202
64. Kars	308	74	3	45
65. Kuban	4,687	3,626	333	522
66. Kutais	1,681	2,188	1,068	410
67. Stavropol	1,179	621	1	175
68. Terek	2,718	2,352	43	487
69. Tiflis	4,352	3,192	213	640
70. Chernomorsk	1,036	1,230	535	83
71. Erivan	1,900	123	7	106
REGIONAL TOTAL	25,845	16,902	5,517	3,162
Central Asia				
72. Akmolinsk	750	1,176	67	284
73. Zakaspisk	1,072	4,776	844	343
74. Samarkand	1,637	592	23	103
75. Semipalatinsk	1,237	2	221	96
76. Semireche	1,322	6	12	121
77. Syr Daria	3,508	23	61	179
78. Turgai	244	----	2	31
79. Uralsk	1,139	252	68	81
80. Ferghana	4,345	42	20	54
REGIONAL TOTAL	15,254	6,869	1,318	1,292

APPENDIX G (cont.)

REGION	CARTER	RAIL	WATER	POST
Western Siberia				
81. Enisei	2,235	2,326	266	242
82. Tobolsk	1,869	921	774	261
83. Tomsk	2,627	2,939	628	416
REGIONAL TOTAL	6,741	6,177	1,668	919
Eastern Siberia				
84. Zabaikal	1,280	473	228	306
85. Irkutsk	1,956	849	215	354
86. Yakutsk	1,054	41	33	303
REGIONAL TOTAL	4,290	1,363	476	963
Far East				
87. Amur	1,393	12	568	153
88. Sakhalin	22	1	10	19
89. Primorsk	1,708	2,814	1,294	395
REGIONAL TOTAL	3,123	2,827	1,872	567
TOTAL OF ALL REGIONS				
1. Agricultural Ctr.	13,534	35,450	1,118	3,407
2. Middle Volga	19,505	15,544	12,428	3,208
3. Lower Volga	13,742	7,346	6,104	1,273
4. New Russia	32,507	34,650	10,074	5,036
5. Southwest	17,776	13,024	1,057	2,611
6. Little Russia	12,069	16,081	1,009	2,304
7. Industrial Center	51,028	27,514	7,152	5,429
8. White Russia	13,903	17,501	1,852	2,527
9. Lithuania	11,064	10,419	495	1,844
10. Lake	41,213	15,829	5,880	4,724
11. Ural	21,756	7,704	3,815	1,135
12. Baltic	8,086	7,579	4,836	1,697
13. Northern	2,391	1,014	2,138	451
14. Russian Poland	20,691	18,416	1,156	3,450

APPENDIX G (cont.)

	REGION	CARTER	RAIL	WATER	POST
15.	Transcaucasus	25,845	16,902	5,517	3,162
16.	Central Asia	15,254	6,869	1,318	1,292
17.	Western Siberia	6,741	6,177	1,668	919
18.	Eastern Siberia	4,290	1,363	476	963
19.	Far East	3,123	2,827	1,872	567
	GRAND TOTAL	334,518	262,209	69,965	45,999

SOURCE: Tsentralnyi statisticheskii komitet. Pervaia vseobshchaia perepis naselniia Rossiskoi Imperii 1897 g. Volumes 1-89. St. Petersburg, 1899-1904.

APPENDIX H

THE AGE AND SEX COMPOSITION OF CARTERS AND OTHER OVERLAND CARRIAGE WORKERS IN RUSSIA, 1897

	Guberniia	Under 12		13 - 14		15 - 16		17 - 19		20 - 39	
		M	F	M	F	M	F	M	F	M	F
European Russia											
1.	Archangel	--	--	3	--	116	--	97	--	764	2
2.	Astrakhan	1	--	3	--	28	--	164	1	2,026	18
3.	Bessarabia	2	--	8	--	41	--	106	1	1,782	11
4.	Vilna	17	--	11	--	28	--	158	2	1,873	13
5.	Vitebsk	2	--	8	--	28	--	143	4	1,625	30
6.	Vladimir	2	--	15	--	60	--	212	2	1,600	8
7.	Vologda	2	--	4	--	29	--	85	--	511	2
8.	Volynia	4	2	12	2	43	--	193	2	2,445	15
9.	Voronezh	1	--	2	--	18	1	117	--	1,146	8
10.	Viatka	5	2	104	15	169	48	285	63	1,639	105
11.	Grodno	--	--	5	--	39	--	156	3	1,925	12
12.	Don	1	--	8	--	28	--	263	2	4,513	17
13.	Ekaterinoslav	5	--	12	--	47	1	260	6	2,647	11
14.	Kazan	6	--	10	--	37	11	161	--	1,490	11
15.	Kaluga	2	--	3	--	30	--	129	3	1,093	7
16.	Kiev	6	1	9	--	91	2	538	5	5,195	33
17.	Kovno	1	1	6	2	43	1	106	1	1,479	63
18.	Kostroma	7	--	19	--	38	1	133	--	1,030	11
19.	Kurland	--	--	2	--	8	--	47	5	736	13
20.	Kursk	--	--	5	--	22	--	75	--	618	10
21.	Lifland	6	--	3	--	8	1	114	1	2,544	25
22.	Minsk	7	1	29	1	111	--	400	1	3,348	12

APPENDIX H (cont.)

Guberniia	Under 12		13 - 14		15 - 16		17 - 19		20 - 39	
	M	F	M	F	M	F	M	F	M	F
23. Mogilev	1	--	7	---	25	1	170	--	1,586	10
24. Moscow	8	--	47	---	411	--	2,858	4	24,202	108
25. Nizhni-Novgorod	7	--	13	2	96	6	388	6	2,836	118
26. Novgorod	34	--	70	---	105	11	219	14	1,214	33
27. Olonets	1	--	27	1	53	5	177	15	370	15
28. Orenburg	--	--	37	---	161	--	410	7	2,882	35
29. Orel	2	--	7	---	42	--	123	--	1,280	6
30. Penza	4	--	7	---	15	--	77	--	661	1
31. Perm	34	3	203	11	499	25	1,394	63	9,165	132
32. Podolia	3	--	1	---	40	--	155	--	1,737	8
33. Poltava	1	--	5	---	53	1	209	1	2,053	16
34. Pskov	1	--	2	---	6	--	39	--	369	3
35. Riazan	1	--	13	---	43	--	230	--	2,428	10
36. Samara	2	--	5	---	28	2	154	3	2,065	38
37. St. Peters-burg	6	--	36	---	179	1	2,471	8	24,288	149
38. Saratov	6	3	17	---	77	--	287	1	2,743	32
39. Simbirsk	2	--	7	---	36	--	165	--	1,636	3
40. Smolensk	1	--	10	---	25	--	90	--	918	5
41. Tavrida	4	--	11	---	54	2	260	2	3,249	23
42. Tambov	3	--	10	---	42	--	126	1	1,053	14
43. Tver	3	--	17	1	45	10	167	3	1,198	8
44. Tula	--	--	3	---	9	--	94	--	920	7
45. Ufa	--	--	3	---	57	--	136	--	897	8
46. Kharkov	2	--	15	---	61	1	308	1	2,329	26
47. Kherson	5	--	21	1	72	2	377	11	5,403	97

APPENDIX H (cont.)

Guberniia	Under 12 M	Under 12 F	13 - 14 M	13 - 14 F	15 - 16 M	15 - 16 F	17 - 19 M	17 - 19 F	20 - 39 M	20 - 39 F
48. Chernigov	3	--	10	1	72	--	234	--	2,202	18
49. Estland	1	--	2	--	3	--	34	--	763	2
50. Yaroslavl	5	--	8	--	60	--	214	--	1,723	1
TOTAL	217	13	895	92	3,410	121	15,508	242	144,199	1,263
Russian Poland										
51. Warsaw	2	--	31	--	63	1	239	8	5,000	37
52. Kalisz	1	--	--	---	8	1	30	--	549	2
53. Kielce	--	--	4	---	10	1	18	--	429	3
54. Lomza	1	--	4	---	8	1	32	--	535	2
55. Lublin	1	--	2	---	6	--	35	--	769	6
56. Piotrkow	--	--	9	---	37	2	147	4	2,214	20
57. Plock	1	--	2	---	2	--	21	1	245	1
58. Radom	--	--	2	---	3	2	29	1	708	9
59. Suwalki	1	--	1	---	9	--	32	1	417	5
60. Siedlce	--	1	1	---	12	--	39	1	770	5
TOTAL	7	1	56	---	158	8	622	16	11,636	90
Transcaucasus										
61. Baku	31	1	25	---	175	--	305	1	3,634	3
62. Dagestan	2	--	--	---	6	--	20	--	448	6
63. Elisavetpol	11	--	8	---	36	--	68	--	868	3
64. Kars	--	--	--	---	3	--	11	--	208	--
65. Kuban	4	1	14	---	41	3	133	--	2,260	91

APPENDIX H (cont.)

Guberniia	Under 12 M	Under 12 F	13 - 14 M	13 - 14 F	15 - 16 M	15 - 16 F	17 - 19 M	17 - 19 F	20 - 39 M	20 - 39 F
Transcaucasus (cont.)										
66. Kutais	10	--	4	--	38	--	152	1	1,116	6
67. Stavropol	2	--	2	--	14	--	49	--	600	5
68. Terek	2	--	10	--	26	1	104	--	1,324	22
69. Tiflis	14	--	31	--	89	--	247	3	2,484	13
70. Chernomorsk	2	--	2	---	13	1	40	--	694	4
71. Erivan	1	--	3	---	34	1	56	1	1,116	4
TOTAL	79	2	99	---	475	6	1,185	6	14,752	153
Central Asia										
72. Akmolinsk	--	--	---	--	7	--	37	--	410	--
73. Zakaspisk	1	--	3	--	18	--	42	--	740	--
74. Samarkand	5	--	5	---	22	--	55	--	856	2
75. Semipalatinsk	2	--	7	---	17	3	66	1	717	3
76. Semireche	3	--	2	---	15	1	53	1	748	7
77. Syr Daria	22	2	17	11	43	1	108	4	1,900	10
78. Turgai	--	--	1	---	--	--	15	--	155	--
79. Uralsk	1	--	3	---	5	--	30	--	592	9
80. Ferghana	5	--	11	---	36	--	103	--	1,879	10
TOTAL	39	2	49	1	163	5	509	6	7,997	41

APPENDIX H (cont.)

Guberniia	Under 12		13 - 14		15 - 16		17 - 19		20 - 39	
	M	F	M	F	M	F	M	F	M	F
Western Siberia										
81. Enisei	2	--	5	--	35	2	149	--	1,170	12
82. Tobolsk	5	--	20	--	34	1	131	7	935	30
83. Tomsk	6	--	13	--	38	1	142	5	1,287	17
TOTAL	13	--	38	--	107	4	422	12	3,392	59
Eastern Siberia										
84. Zabaikal	--	--	9	--	22	--	686	1	386	4
85. Irkutsk	2	--	12	--	28	--	115	--	1,019	16
86. Yakutsk	--	--	1	--	14	--	26	--	548	6
TOTAL	2	--	22	--	64	--	827	1	1,953	26
Far East										
87. Amur	2	--	1	--	12	--	64	--	996	1
88. Sakhalin	--	--	--	--	--	--	--	--	9	2
89. Primorsk	--	--	4	--	13	2	61	1	1,077	11
TOTAL	2	--	5	--	25	2	125	1	2,082	14
GRAND TOTAL										
European Russia	217	13	895	92	2,410	121	15,508	242	144,199	1,263
Russian Poland	7	1	56	--	158	8	622	16	11,636	90
Transcaucasus	79	2	99	--	475	6	1,185	6	14,752	153
Central Asia	39	2	49	1	163	5	509	6	7,997	41
Western Siberia	13	--	38	--	107	4	422	12	3,392	59
Eastern Siberia	2	--	22	--	64	--	827	1	1,953	26
Far East	2	--	5	--	25	2	125	1	2,082	14

APPENDIX H (cont.)

Guberniia	40 - 59 M	40 - 59 F	Over 60 M	Over 60 F	Total Unknown M	Total Unknown F	Total M	Total F	TOTAL
European Russia									
1. Archangel	444	7	70	--	--	--	1,494	9	1,503
2. Astrakhan	1,384	12	282	--	--	--	3,888	31	3,919
3. Bessarabia	1,263	12	232	9	2	--	3,436	33	3,469
4. Vilna	1,314	8	409	2	2	--	3,812	25	3,837
5. Vitebsk	1,132	15	325	15	2	--	3,265	53	3,318
6. Vladimir	1,017	13	175	2	1	--	3,082	25	3,107
7. Vologda	214	3	35	2	1	--	881	7	888
8. Volynia	1,465	17	419	2	2	1	4,583	41	4,624
9. Voronezh	668	13	144	6	7	--	2,103	28	2,131
10. Viatka	807	19	119	1	1	--	3,129	252	3,381
11. Grodno	1,126	7	318	5	1	--	3,570	27	3,597
12. Don	2,783	16	585	10	6	--	8,187	45	8,232
13. Ekaterinoslav	1,323	9	226	4	2	1	4,522	32	4,554
14. Kazan	925	11	174	3	--	--	2,803	25	2,828
15. Kaluga	469	10	91	--	5	--	1,822	20	1,842
16. Kiev	*	*	*	*	*	*	*	*	9,699
17. Kovno	1,359	17	548	2	2	1	3,544	86	3,630
18. Kostroma	524	8	94	3	1	1	1,846	24	1,870
19. Kurland	644	10	187	--	--	--	1,624	28	1,652
20. Kursk	372	8	78	1	--	--	1,170	19	1,189
21. Lifland	1,836	33	325	10	1	--	4,837	70	4,907
22. Minsk	1,728	10	576	1	4	--	6,203	26	6,229
23. Mogilev	781	3	194	2	1	--	2,765	16	2,781
24. Moscow	10,034	126	955	21	10	--	38,525	259	38,784
25. Nizhni-Novgorod	1,391	21	222	1	4	--	4,957	54	5,011
26. Novgorod	666	16	166	4	1	1	2,475	79	2,554
27. Olonets	220	6	38	2	--	--	886	44	930
28. Orenburg	1,943	29	461	7	4	--	5,898	78	5,976

APPENDIX H (cont.)

Guberniia	40 - 59 M	40 - 59 F	Over 60 M	Over 60 F	Unknown M	Unknown F	Total M	Total F	Total
European Russia (cont.)									
29. Orel	863	8	197	6	--	--	2,154	20	2,534
30. Penza	316	4	65	--	--	--	1,145	5	1,150
31. Perm	5,637	95	1,097	8	9	--	18,038	337	18,375
32. Podolia	1,236	10	257	4	2	--	3,431	22	3,453
33. Poltava	1,222	11	247	5	2	--	3,792	34	3,826
34. Pskov	220	3	42	1	1	--	,680	7	687
35. Riazan	1,201	8	147	1	1	--	4,064	19	4,083
36. Samara	1,263	13	270	2	2	--	3,789	58	3,847
37. St. Petersburg	9,047	171	650	27	9	--	36,686	356	37,042
38. Saratov	2,035	20	504	6	1	--	5,670	62	5,732
39. Simbirsk	834	1	135	--	1	--	2,816	4	2,820
40. Smolensk	424	12	62	1	27	--	1,557	18	1,575
41. Tavrida	1,919	25	410	8	2	--	5,909	60	5,969
42. Tambov	659	12	156	5	4	--	2,053	32	2,085
43. Tver	759	11	113	2	2	--	2,304	35	2,339
44. Tula	393	5	76	1	4	--	1,499	13	1,512
45. Ufa	670	13	169	6	5	--	1,937	27	1,964
46. Kharkov	1,117	--	200	5	2	--	4,034	33	4,067
47. Kherson	3,516	78	686	11	3	--	10,083	200	10,283
48. Chernigov	1,302	14	333	2	6	--	4,141	35	4,176
49. Estland	565	26	125	4	2	--	1,495	32	1,527
50. Yaroslavl	936	7	131	--	1	--	3,078	8	3,086
Total	73,966	1,006	13,520	209	146	5	246,022	2,853	258,574

APPENDIX H (cont.)

Guberniia	40 - 59 M	40 - 59 F	Over 60 M	Over 60 F	Total Unknown M	Total Unknown F	Total M	Total F	Total
Russian Poland									
51. Warsaw	2,751	37	562	16	3	--	8,651	99	8,750
52. Kalisz	476	5	76	4	--	--	1,140	12	1,152
53. Kielce	217	4	45	--	--	--	723	8	731
54. Lomza	363	--	65	1	--	--	1,008	4	1,012
55. Lublin	497	4	117	--	2	--	1,429	10	1,439
56. Piotrkow	970	23	186	2	3	--	3,566	51	3,617
57. Plock	190	3	71	--	--	--	532	5	537
58. Radom	357	5	80	2	1	--	1,180	19	1,199
59. Suwalki	294	11	103	2	--	--	860	19	879
60. Siedlce	424	2	118	2	--	--	1,364	11	1,375
Total	6,539	94	1,423	29	9	--	20,453	238	20,691
Transcaucasus									
61. Baku	1,276	5	266	--	17	--	5,729	10	5,739
62. Dagestan	248	2	37	1	--	--	761	9	770
63. Elisavetpol	375	3	93	--	10	--	1,469	6	1,475
64. Kars	73	--	12	--	1	--	308	--	308
65. Kuban	1,741	7	378	13	1	--	4,572	115	4,687
66. Kutais	311	1	37	--	5	--	1,673	8	1,681
67. Stavropol	420	--	87	--	--	--	1,174	5	1,179
68. Terek	996	13	208	10	2	--	2,672	46	2,718
69. Tiflis	1,164	10	287	8	2	--	4,318	34	4,352
70. Chernomorsk	245	3	21	--	1	--	1,028	8	1,036
71. Erivan	575	1	108	--	--	--	1,893	7	1,900
Total	7,424	45	1,534	32	39	--	25,597	248	25,845

APPENDIX H (cont.)

Guberniia	40 - 59 M	40 - 59 F	Over 60 M	Over 60 F	Total Unknown M	Total Unknown F	Total M	Total F	Total
Central Asia									
72. Akmolinsk	246	1	47	--	--	--	749	1	750
73. Zakaspisk	235	--	31	--	2	--	1,072	--	1,072
74. Samarkand	597	2	92	--	1	--	1,633	4	1,637
75. Semipalatinsk	332	7	77	3	2	--	1,220	17	1,237
76. Semireche	393	6	87	5	1	--	1,302	20	1,322
77. Syr Daria	1,136	12	236	7	9	--	3,471	37	3,508
78. Turgai	62	1	10	--	--	--	243	1	244
79. Uralsk	418	9	68	1	3	--	1,120	19	1,139
80. Ferghana	1,845	6	446	3	--	1	4,325	20	4,345
Total	5,264	44	1,094	19	18	1	15,135	119	15,254
Western Siberia									
81. Enisei	589	18	154	5	4	--	2,208	37	2,245
82. Tobolsk	549	14	139	2	2	--	1,815	54	1,869
83. Tomsk	875	23	214	5	1	--	2,576	51	2,627
Total	2,113	55	507	12	7	--	6,599	142	6,741
Eastern Siberia									
84. Zabaikal	386	4	75	1	1	--	1,274	6	1,280
85. Irkutsk	635	5	118	1	5	--	1,934	22	1,956
86. Yakutsk	368	5	86	--	--	--	1,043	11	1,054
Total	1,389	14	219	2	6	--	4,251	39	4,290

APPENDIX H (cont.)

Guberniia	40 - 59 M	40 - 59 F	Over 60 M	Over 60 F	Total Unknown M	Total Unknown F	Total M	Total F	Total
Far East									
87. Amur	272	4	38	--	3	--	1,388	5	1,393
88. Sakhalin	11	--	--	--	--	--	20	2	22
89. Primorsk	473	5	57	2	2	--	1,687	21	1,708
Total	756	9	95	2	5	--	3,095	28	3,123
GRAND TOTAL									
European Russia	73,966	1,006	13,520	209	146	5	246,022	2,853	258,574
Russian Poland	6,539	94	1,423	29	9	--	20,453	238	20,691
Transcaucasus	7,424	45	1,534	32	39	--	25,597	248	25,845
Central Asia	5,264	44	1,094	19	18	1	15,135	119	15,254
W st Siberia	2,113	55	507	12	7	--	6,599	142	6,741
East Siberia	1,389	14	219	2	6	--	4,251	39	4,290
Far East	756	9	95	2	5	--	3,095	28	3,123
							321,152	3,667	334,518

SOURCE: Compiled from Russia, Tsentralnyi statisticheskii komitet. Pervaia vseobshchaia perepis naselniia Rossiiskoi Imperii 1897 g. Volumes 1-89. St. Petersburg, 1899-1904.

*The figures for Kiev are not given due to a defective original Imperial document. Only the total is available. Therefore, the last two columns will not add equally.

APPENDIX I

WORKERS EMPLOYED IN OVERLAND CARRIAGE TRADE, 1897

	Guberniia	Firewood/ Lumber	Cabmen	Drivers	Mining	Porters-Stevedores
European Russia						
1.	Archangel	---	43	16	3	15
2.	Astrakhan	---	158	---	---	---
3.	Bessarabia	484	127	8	13	3
4.	Vilna	91	47	---	328	154
5.	Vitebsk	---	217	9	---	3
6.	Vladimir	4,683	382	4	101	69
7.	Vologda	3,950	290	10	---	4
8.	Volynia	2,975	687	5	62	19
9.	Voronezh	289	632	9	3	---
10.	Viatka	2,663	440	5	1,578	16
11.	Grodno	2,625	51	6	---	1
12.	Don	1	64	6	---	32
13.	Ekaterinoslav	276	364	121	1,267	920
14.	Kazan	1,013	296	5	---	58
15.	Kaluga	---	420	16	105	1
16.	Kiev	3,570	434	2	32	22
17.	Kovno	648	53	---	3	6
18.	Kostroma	4,569	249	1	3	46
19.	Kurland	237	30	---	1	---
20.	Kursk	148	486	42	55	5
21.	Lifland	---	42	---	5	---
22.	Minsk	17,267	151	4	5	1
23.	Mogilev	10,523	192	8	3	1
24.	Moscow	1,514	2,253	3	12	---
25.	Nizhni-Novgorod	3,874	755	3	466	107
26.	Novgorod	16,612	372	32	---	109
27.	Olonets	---	114	3	23	11
28.	Orenburg	484	329	4	242	---
29.	Orel	2,081	183	3	---	15
30.	Penza	455	65	2	---	3
31.	Perm	6,836	1,212	7	10,571	---
32.	Podolia	653	709	15	97	5
33.	Poltava	268	327	---	2	19
34.	Pskov	1,624	241	9	---	---
35.	Riazan	542	492	22	12	714
36.	Samara	50	799	87	69	41

APPENDIX I (cont.)

	Guberniia	Firewood/ Lumber	Cabmen	Drivers	Mining	Porters-Stevedores
37.	St. Petersburg	2,464	1,936	8	15	8
38.	Saratov	397	225	4	5	43
39.	Simbirsk	1,457	178	6	1	610
40.	Smolensk	11,106	907	29	1	117
41.	Tavrida	319	126	5	---	155
42.	Tambov	1,957	353	63	39	21
43.	Tver	6,572	452	16	164	102
44.	Tula	288	286	40	320	22
45.	Ufa	379	305	---	481	---
46.	Kharkov	---	---	---	---	---
47.	Kherson	2	443	5	476	45
48.	Chernigov	2,441	209	13	125	5
49.	Estland	41	13	7	---	---
50.	Yaroslavl	2,062	330	25	---	97
	TOTAL	117,865	19,349	633	16,688	3,628
	Russian Poland					
51.	Warsaw	158	115	3	--	1
52.	Kalisz	76	57	--	22	1
53.	Kielce	4	33	3	70	--
54.	Lomza	---	29	1	--	--
55.	Lublin	---	76	--	--	2
56.	Piotrkow	93	65	4	54	4
57.	Plock	---	26	3	--	1
58.	Radom	9	19	1	--	1
59.	Suwalki	151	37	6	--	6
60.	Siedlce	48	48	2	19	--
	TOTAL	539	505	23	165	16
	Transcaucasus					
61.	Baku	26	35	--	20	--
62.	Dagestan	39	33	--	543	--
63.	Elisavetpol	67	18	--	15	--
64.	Kars	113	6	--	--	18
65.	Kuban	846	233	3	6	38
66.	Kutais	4	18	14	21	13

APPENDIX I (cont.)

Guberniia	Firewood/ Lumber	Cabmen	Drivers	Mining	Porters-Stevedores
Transcaucasus (cont.)					
67. Stavropol	1	142	3	6	3
68. Terek	146	158	4	1	8
69. Tiflis	29	22	3	1	14
70. Chernomorsk	---	1	--	---	--
71. Erivan	---	56	31	---	14
TOTAL	1,271	722	58	647	108
Central Asia					
72. Akmolinsk	11	89	--	---	1
73. Zakaspisk	54	1	--	434	---
74. Samarkand	---	13	--	14	34
75. Semipalatinsk	289	49	8	---	---
76. Semireche	---	---	--	---	125
77. Syr Daria	---	---	--	---	---
78. Turgai	---	7	--	1	---
79. Uralsk	---	168	--	---	---
80. Ferghana	---	67	--	1	1
TOTAL	354	394	8	450	161
Western Siberia					
81. Enisei	---	113	--	115	1
82. Tobolsk	---	65	4	---	3
83. Tomsk	179	65	3	13	--
TOTAL	179	243	7	128	4
Eastern Siberia					
84. Zabaikal	16	216	2	42	17
85. Irkutsk	115	222	3	--	--
86. Yakutsk	24	27	--	--	--
TOTAL	155	465	5	42	17

APPENDIX I (cont.)

Guberniia	Firewood/ Lumber	Cabmen	Drivers	Mining	Porters-Stevedores
Far East					
87. Amur	172	4	---	---	1
88. Sakhalin	---	--	---	---	--
89. Primorsk	41	89	---	---	11
TOTAL	213	93	---	---	12

SOURCE: Compiled from Russia, Tsentralnyi statisticheskii komitet. Pervaia vseobshchaia perepis naselniia Rossiiskoi Imperii 1897 g. Volumes 1-89 (St. Petersburg, 1899-1904).

BIBLIOGRAPHY

Books in English

Abbott, John. The Monarchies of Continental Europe, The Empire of Russia. New York; Mason, 1862.

_____. Narrative of a Journey from Herat to Khiva, Moscow, and St. Petersburg. 2 vols. London: Allen, 1884.

Alexinsky, Gregor. Modern Russia. Tr. B. Miall. London: T. Fisher and Unwin, 1913.

Alison, A. History of Europe. Vol. 2. London: W. Blackwood, 1854.

Almedinger, E. M. The Emperor Alexander II. London: Badley House, 1962.

Atkinson, Thomas W. Oriental and Western Siberia. New York: Harper, 1853.

Auteroche, Chappe. A Journey into Siberia, Made by Order of the King of France. Tr. ed. from French. London: T. Jeffreys, 1770.

Baddeley, John F. The Russian Conquest of the Caucasus. New York: Longmans, Gwen, 1908.

Baedeker, Karl. Russia, with Teheran, Port Arthur, and Peking: Handbook for Travellers. Leipzig: K. Baedeker, 1914.

Bain, Nesbit. Peter III. Westminster, Eng.: A. Constable, 1902.

Balzak, S. Economic Geography of the USSR. Trs. O. Titelbaum and R. Hankin. New York: Macmillan, 1949.

Baring, Maurice. Russian Essays and Stories. London: Methuen, 1908.

Barry, Herbert. Ivan at Home. London: The Publishing Co., 1872.

Beable, William H. Commercial Russia. London: Constable, 1918.

Bell, John. Travels from St. Petersburg in Russia to Various Parts of Asia. Edinburg, Scotland: W. Cruch, 1812.

Bigland, John. Geographies and Historical View of the World. 5 vols. Boston: T.B. Wait and C. Williams, 1812.

Blackwell, William. The Beginnings of Russian Industrialization, 1800-1860. Princeton, N.J.: Princeton University Press, 1968.

_____. The Industrialization of Russia. New York: T.Y. Crowell, 1970.

_____. Russian Economic Development from Peter the Great to Stalin. New York: New Viewpoints, 1974.

Blum, Jerome. Lord and Peasant in Russia. Princeton, N.J.: Princeton University Press, 1961.

Bookwalter, John W. Siberia and Central Asia. New York: F.A. Stokes, 1899.

Botting, Douglas. Humbolt and the Cosmos. New York: Harper and Row, 1973.

Bourke, Richard S. St. Petersburg and Moscow. 2 vols. London: H. Colburn, 1848.

Bouton, John B. Roundabout to Moscow. New York: Appleton, 1887.

Bremmer, Robert. Excursions in the Interior of Russia: Sketches of the Character and and Policy of the Emperor Nicholas. 2 vols. London: Colburn, 1839.

Brown, John C. Forests and Forestry of Northern Russia and Lands Beyond. Edinburg, Scotland: Oliver and Boyd, 1884.

Brown, Robert. The Countries of the World. 6 vols. London: Cassell, Peter, and Galpin, 1918.

Browning, Oscar. Peter The Great. London: Hutchinson, 1898.

Buckley, J. N. The Midnight Sun, The Tsar and The Nihilist. Boston: D. Lothrop, 1886.

Burnaby, Frederick. A Ride to Khiva; Travels and Adventures in Central Asia. London: Cassell, Peter, and Galpin, 1878.

Burns, Alexander. Travels into Bokhara. 3 vols. London: Oxford University Press, 1873.

Burr, Malcolm. In Bolshevik Russia. London: H. F. and G. Witherby, 1931.

Bush, Richard. Reindeer, Dogs, and Snow-Shoes. New York: Harpers, 1871.

Catera, Mr. The Life of Catherine II. 3 vols. London: J. Nichols, 1800.

Chekhov, Anton. The Island, A Journey to Sakhalin. Trs. Luba and Michael Terpak. New York: Washington Square Press, 1967.

_____. The Unknown Chekhov. Tr. A. Yarmolinsky. New York: Noonday Press, 1954.

Child, Richard W. Potential Russia. New York: Dutton, 1916.

Choiseul-Gouffier, La Comtesse Madam. Historical Memory of the Emperor Alexander I. Tr. M. B. Patterson. London: Kegan Paul. French, Trubner, 1904.

Clark, Edward D. Travels of Europe, Asia and Africa, Part I, Russia Tartary and Turkey. London: Cadell and Davies, 1816.

Clarkson, J. D. A History of Russia. New York: Random House, 1961.

Cochrane, John D. Narrative of a Pedestrian Journey through Russia and Siberian Tartary. 2 vols. London: C. Knight, 1825.

_____. A Pedestrian Journey through Russia. 2 vols. Edinburg, Scotland: Constable, 1829.

Collins, Mc.D. P. Overland Explorations in Siberia, Northern Asia and the Great Amur River Country. New York: Appleton, 1864.

_____. Siberian Journey: Down the Amur to the Pacific, 1856-1857. Madison: University of Wisconsin Press, 1962.

Colquhon, Archibald P. Overland to China. New York: Harpers, 1900.

Cottrell, Charles H. Recollections of Siberia in the Years 1840 and 1841. London: Parker, 1842.

Coxe, William. Travels in Poland, Russia, Sweden, and Denmark. 3 vols. London: Parker, 1842.

Coxwell, C. F. Through Russia in Wartime. New York: Scribners, 1907.

Crisp, Olga. Studies in the Russian Economy before 1914. New York: Barnes and Noble, 1976.

Cronin, Vincent. Catherine, Empress of all the Russias. London: Collins, 1978.

Curtin, Jeremiah. A Journey in Southern Russia. Boston: Little, Brown, 1909.

Custine, A. The Empire of the Tsar. 2 vols. London: Longman, Brown, Green, and Longmans, 1843.

_____. Journey for our Times. Ed. P. P. Kohler. Chicago: H. R. Co., 1951.

_____. Russia. Tr. from French. New York: Appleton, 1855.

Czaplika, M. A. Aboriginal Siberia. Oxford, Eng.: Clarendon Press, 1917.

Dashkaw, Ekaterina R. Memoirs of the Princess Dashkaw. 2 vols. London: H. Colburn, 1840.

DeLagny, Germain. The Knout and the Russians. London: D. Boque, 1854.

DeSegur, Philip. History of Russia and of Peter the Great. London: Treuttel and Wurtz, Jun and Richter, 1829.

DeTegorborski, M. L. Commentaries on the Productive Forces of Russia. 2 vols. London: Longman, Brown, Green, and Longmans, 1856.

Deutsch, Leo. Sixteen Years in Siberia. New York: Dutton, 1904.

Dillon, E. J. The Eclipse of Russia. London: J. M. Dent, 1918.

Dixon, William H. Free Russia. 2 vols. Leipzig: B. Tawchnitz, 1872.

Dobb, Maurice. Soviet Economic Development since 1917. New York: International Publishers, 1948.

Dobson, George. Russia's Railway Advance into Central Asia. London: W. H. Allen, 1890.

Doroshinskaya, Y. and Kuchina-Bogdanov, V. Leningrad. Moscow: Progress Publishers, 1979.

Doyle, G. R. The World's Automobiles: 1881-1931. Middlesex, Eng.: Windmill Hill, 1931.

Elliot, C. B. Travels in the Three Great Empires of Austria, Russia, and Turkey. 2 vols. London: R. Bentley, 1838.

Englehardt, Alexander P. A Russian Province of the North. Tr. H. Cooke. Philadelphia: Lippincott, 1899.

Erman, Adolph. Travels in Siberia. 2 vols. London: Longman, Brown, Green, and Longmans, 1848.

Ermolov, A. S. The Bisons of the Caucasus. Washington, D.C.: The Smithsonian Institute, 1893.

Fetridge, W. P. Harper's Handbook for Travellers in Europe and the East. New York: Harpers, 1867.

Fletcher, Giles. Of the Russ Commonwealth. Ed. A. F. Schmidt. Ithaca, N.Y.: Cornell University Press, 1966.

Florinsky, Michael. Russia, A History and Interpretation. 2 vols. New York: Macmillan, 1970.

Fuhrmann, John T. The Origins of Capitalism in Russia. Chicago: Quadrangle Books, 1972.

Gautier, Theophile. Russia. 2 vols. Tr. E. Tyson. Philadelphia: John C. Winston, 1905.

_____. A Winter in Russia. Tr. M. M. Ripley. New York: Holt, 1875.

Geddie, John. The Russian Empire: Historical and Descriptive. London: Nelson, Pasternaster, Row, 1882.

Gerrare, Wirt. Greater Russia. New York: Macmillan, 1903.

Gerschenkron, Alexander. Europe in the Russian Minor. Cambridge, Eng.: Cambridge University Press, 1970.

Giers, N. K. The Education of a Russian Statesman. Eds. C. and B. Jalavich. Berkeley: University of California Press, 1962.

Gillmore, Q. A. A Practical Treatise on Roads, Streets, and Pavements. New York: Van Nostrand, 1888.

Gogol, N. V. Dead Souls. Tr. I. Hapgood. 2 vols. New York: Crowell, 1886.

Golovine, Ivan. Russia Under the Autocrat Nicholas the First. 2 vols. London: Colburn, 1846.

Gowing, Lionel F. Five Thousand Miles in a Sledge. London, Eng.: Chatto and Windus, Piccadilly, 1889.

Graham, Stephen. Peter The Great. New York: Simon and Schuster, 1913.

Hagemeister, Julius de. Report on the Commerce of the Ports of New Russia, Moldavia, and Wallachia to the Russian Government in 1835. Tr. T. F. Triebner. London: Effingham Wilson, Royal Exchange, 1835.

Hanway, Jonas. An Historical Account of the British Trade over the Caspian Sea. 2 vols. London: Longman, Davies, Hitch, Millars, Whiston, White, Dodsley, and Vivington, 1754.

Hapgood, Isabel. Russian Rambles. Boston: Houghton, Mifflin, 1895.

Hawes, Charles H. In the Uttermost East. London: Harpers, 1904.

Haxthausen, August von. The Russian Empire, Its People, Institutions and Resources. 2 vols. Tr. R. Faire. London: 1856.

_____. Studies on the Interior of Russia. Tr. E. Schmidt. Chicago: University of Chicago Press, 1972.

Haywood, Richard M. The Beginnings of Railway Development in Russia in the Reign of Nicholas I, 1835-1842. Durham, N.C.: Duke University Press, 1969.

Hellman, L. The Selected Letters of Anton Chekhov. Tr. S. Lederer. New York: Farrar, Straus, 1955.

Herzen, Alexander. My Past Thoughts. Tr. C. Garnett. New York: Knopf, 1968.

Hingley, Ronald. The New Life of Anton Chekhov. New York: Knopf, 1976.

Holderness, Mary. Journey from Riga to the Crimea. London: Pasternaster, Row, 1827.

_____. New Russia, Journey from Riga to the Crimea by Way of Kiev. London: Sherwood and Jones, 1823.

Holman, James. Travels through Russia. 2 vols. London: Smith and Elder, 1834.

Howe, G. M. The Soviet Union. London: MacDonald and Evans, 1968.

Hubbock, John. Russian Realities. London: Simkin, Marshall, Hamilton, and Kent, 1914.

Hume, George. Thirty-Five Years in Russia. 2 vols. London: Smith and Elder, 1834.

Jackson, Frederick G. The Great Frozen Land. London: Macmillan, 1895.

Johnston, A. K. The Royal Atlas of Modern Geography, Exhibiting in a Series of Entirely Original and Authentic Maps, the Present Condition and Geographical Discovery and Research in the Seven Countries, Empires, and States of the World. London: W. Blackwood, 1816.

Jorre, Georges. The Soviet Union: The Land and Its People. Tr. E. D. Laborde. New York: Wiley, 1967.

Kelly, Laurence. Lermontov, Tragedy in the Caucasus. New York: G. Brazelles, 1978.

Kelly, Walter K. The History of Russia. 2 vols. London: H. G. Bohn, 1850.

Kennan, George. Siberia and the Exile System. 2 vols. New York: Century Press, 1891.

_____. Tent Life in Siberia. New York: Putnam, 1910.

Kinglake, Alexander W. The Invasion of the Crimea. 6 vols. New York: Harper and Row, 1881.

Kluchevsky, Vasiliy O. A History of Russia. 4 vols. Tr. C. J. Horgarth. New York: Russell and Russell, 1960.

Knox, Thomas W. Overland Through Asia. Hartford, Conn.: American Publishing, 1870.

Kochan, Miriam. The Last Days of Imperial Russia. New York: Macmillan, 1976.

_____. Life in Russia Under Catherine the Great. London: B. T. Batsford, 1969.

Kohl, J. G. Russia and the Russians in 1842. 2 vols. London: H. Colburn, 1844.

Konigsberger, Hans. Along the Road of New Russia. New York: Farrar Straus and Giroux, 1968.

Kononenko, K. A History of the Economic Relations Between Ukraine and Russia, 1654-1917. Milwaukee, Wis.: Marquette University Press, 1958.

Korb, Johanne. Diary of an Austrian Secretary Legation. 2 vols. Tr. Count Macdonnell. London: Bradbury and Evans, 1863.

Kotzebue, Augustus von. The Most Remarkable Year in the Life of Augustus Kotzebue. 3 vols. Tr. B. Beresford. London: R. Phillips, 1802.

Kravchinskii, S. M. (Stepniak). The Russian Peasantry. New York: Harpers, 1888.

Lady, By A. The Englishwoman in Russia: Impressions of the Society and Manners of the Russians at Home. New York: Scribners, 1855.

Lanin, E. B. (pseud.). Russian Characteristics. London: Chapman and Hall, 1892.

Lansdell, Henry. Russian Central Asia. 2 vols. London: Sampson, Low, Marston, Searle, and Rivington, 1885.

_____. Through Siberia. London: Sampson, Low, Marston, Searle, and Rivington, 1882.

Lesseps, Jean B. baron de. Travels in Kamchatka During the Years 1787 and 1788. Trans. from French. London: Johnson, 1790.

Levin, M. G. and Potapov, L. P. The Peoples of Siberia. Tr. Scripta Technica, Inc. Ed. S. P. Dunn. Chicago: University of Chicago Press, 1964.

Lorimer, Frank. The Population of the Soviet Union. Geneva: League of Nations, 1946.

Lyall, Robert. Travels in Russia, the Crimea, the Caucasus, and Georgia. 2 vols. London: T. Cadell, 1825.

Lyashchenko, P. I. History of the National Economy of Russia to the 1917 Revolution. Tr. L. M. Herman. New York: Macmillan, 1949.

McConnell, Allen. Tsar Alexander I. New York: Crowell, 1970.

McPherson, Logan G. Transportation in Europe. New York: Holt, 1910.

Manstein, Christof von. Memoirs of Russia, Historical, Political, and Military. Trs. T. Beket and P. A. Dehond, 1770.

Marsden, Christopher. Palmyra of the North. London: Faber and Faber, 1762.

Marsden, Kate. On Sledge and Horseback to Outcast Siberian Lepers. London: Record Press, 1892.

Marten, Rudolph. The Future of Russia. Tr. H. Friedericks. London: Smith and Elder, 1906.

Martin, John. A Picture History of Russia. New York: Crown, 1945.

Marvine, Charles. The Coming Deluge of Russian Petroleum. London: R. Anderson, 1886.

_____. The Region of the Eternal Fire. London: Allen, 1884.

Maud, Renne. One Year at the Russian Court, 1904-1905. London: J. Lane, 1908.

Maxwell, John. The Czar, His Court and People. New York: Baker and Scribner, 1850.

Meignan, Victor. From Paris to Peking Over Siberian Snows. London: W. S. Sonnenshein, 1885.

Miche, Alexander. The Overland Siberian Route from Peking to Petersburg. London: J. Murray, 1864.

Miller, M. S. and Miller, J. L. Harper's Bible Dictionary. New York: Harper and Brown, 1973.

Molloy, F. The Russian Court in the Eighteenth Century. New York: Scribners, 1905.

Monas, Sidney. The Third Section: Police and Society in Russia under Nicholas I. Cambridge, Mass.: Harvard University Press, 1961.

Morley, Henry. Sketches of Russian Life. London: Chapman and Hall, 1866.

Murray, Hugh. The Encyclopedia of Geography. 2 vols. New York: H. Bill, 1859.

Murray, John. A Handbook for Travellers in Denmark, Sweden, and Russia. London: J. Murray, 1849.

Nansen, Fridtjof. Through Siberia, the Land of the Future. Tr. A. G. Chater. London: W. Heinemann, 1914.

Nechkina, M. V. Russia in the Nineteenth Century. Tr. from Russian by Sir Bernard Pares and O. J. Frederikson. Ann Arbor, Mich.: J. W. Edwards, 1953.

Norman, Henry (Sir). All the Russias: Travels and Studies in Contemporary European Russia, Finland, and Siberia, the Caucasus, and Central Asia. New York: Scribner, 1914.

Oddy, Jepson J. European Commerce. 2 vols. Philadelphia. J. Humphreys, 1807.

Oliphant, Laurence. The Russian Shores of the Black Sea. New York: Redfield, 1854.

Owen, Thomas C. Capitalism and Politics in Russia: A Social History of the Moscow Merchants, 1855-1905. New York: Cambridge University Press, 1981.

Page, Logan W. Roads, Paths, and Bridges. New York: Sturgis and Walton, 1912.

Pahlen, K. K. Mission to Turkestan. Tr. N. J. Couriss. London: Oxford University Press, 1964.

Palmer, Francis. Russian Life in Town and Country. New York: Putnam, 1904.

Pares, Bernard (Sir). A History of Russia. New York: Knopf, 1939.

_____. My Russian Memoirs. New York: AMS Press, 1961.

Parry, Albert, Whistler's Father. New York: Bobbs-Merrill, 1939.

Pavlovsky, George. Agricultural Russia on the Eve of the Revolution. London: George Routledge, 1930.

Perry, John. The State of Russia. London: B. Tooke, 1716.

Pinkerton, John. Russia: or, Miscellaneous Observations in the Past and Present State of that Country and Its Inhabitants. London: Seeley, 1883.

Porter, Robert Kerr. Travelling Sketches in Russia and Sweden, 1805, 1806, and 1807. Philadelphia: Hopkins and Earle, 1809.

Pushkin, Alexandr. Eugene Onegin. Tr. V. Nabokov. Princeton, N.J.: University of Princeton Press, 1964.

Rabble, A. and Duncan, J. History of Russia. 2 vols. London: Herbart Ingram, 1854.

Radishchev, Alexander. A Journey from St. Petersburg to Moscow. Tr. Leo Wierner. Cambridge, Mass.: Harvard University Press, 1958.

Reclus, Elisie. The Earth and Its Inhabitants. Vol. 5. New York: Appleton, 1883.

Rigby, Elizabeth. Letters from the Shores of the Baltic. 2 vols. London: J. Murray, 1842.

St. George, George. Siberia. New York: D. McKay, 1969.

Sala, George. A Journey Due North. London: R. Bentley, 1859.

Scherer, John L. USSR: Facts and Figures Annual. 2 vols. Gulf Breeze, Fla.: Academic International Press, 1978.

Schuyler, Eugene. Peter The Great. 2 vols. New York: Scribners, 1884.

_____. Turkestan. 2 vols. New York: Scribner and Armstrong, 1876.

Scott, Derek. Russian Political Institutions. London: Allen and Unwin, 1969.

Sears, Robert. An Illustrated Description of the Russian Empire. New York: Hurst, 1881.

Seebohn, Henry. The Birds of Siberia. London: J. Murray, 1901.

Seton-Watson, Hugh. The Russian Empire, 1801-1917. Oxford, Eng.: Clarendon Press, 1967.

Simmons, Earnest. Chekhov, A Biography. Boston: Little and Brown, 1962.

Simpson, James Y. Side-Lights in Siberia. London: W. Blackwood, 1898.

Skrine, Francis H. The Expansion of Russia, 1815-1900. Cambridge, Eng.: Cambridge University Press, 1904.

Smith, John. A System of Modern Geography. 2 vols. London: Gillet, 1810.

Smucker, Samuel M. The Life and Reign of Nicholas The Second. Philadelphia: J. W. Bradley, 1856.

Spottiswoode, William. A Tarantasse Journey through Eastern Russia. London: 1857.

Stadling, Jonas J. In the Land of Tolstoi: Experiences of Famine and Misrule in Russia. London: J. Clarke, 1893.

Stephens, J. L. Incidents of Travel in Greece, Turkey, Russia, and Poland. Edinburg, Scotland: William and R. Chambers, 1844.

Stevens, Thomas. Through Russia on a Mustang. New York: Cassell, 1891.

Stoddard, Charles A. Across Siberia. New York: Scribner, 1899.

Sutton, Antony C. Western Technological and Soviet Economic Development, 1917-1930. Stanford, Calif.: Hoover Institution Press, 1968.

_____. Western Technological and Soviet Economic Development, 1930-1945. Stanford, Calif.: Hoover Institution Press, 1971.

Telfer, J. B. The Crimea and Transcaucasia. 2 vols. London: H. King, 1876.

Terra, Helmut de. The Life and Times of Alexander von Humbolt. New York: Knopf, 1955.

Thompson, A. B. The Oil Fields of Russia. London: Crosby Lockwood, 1904.

Tolstoi, Alexi (Count). Peter The Great. Tr. H. C. Matheson. New York: Covici-Friede, 1932.

Tolstoy, Alexey. Peter The Great. Tr. T. Shebunina. New York: Macmillan, 1959.

Tolstoy, Leo. The Death of Ivan Illyitch. New York: Boni and Liveright, 1859.

Tooke, William. History of Russia from the Foundation of the Monarchy by Rurik to the Accession of Catherine the Second. London: T. N. Longman and O. Rees, 1800.

_____. View of the Russian Empire During the Reign of Catherine the Second. 2 vols. Dublin, Ireland: F. Wogan, 1801.

Troyat, H. Pushkin. Tr. N. Amphoulx. New York: Doubleday, 1970.

Turner, Samuel. Siberia: A Record of Travel, Climbing, and Exploration. London: Unwin, 1905.

Tyrell, Henry. History of the Russian Empire to the Accession of Emperor Alexander II. London: The London Publishing Company, 1858.

Utechin, S. V. A Concise Encyclopedia of Russia. New York: Dutton, 1964.

Venables, R. L. Domestic Scenes in Russia. London: J. Murray, 1856.

Vernadsky, George. The Mongols and Russia. New Haven, Conn.: Yale University Press, 1953.

Vladimir (pseud.) Volpicelli, Zenone. Russia on the Pacific and the Siberian Railway. London: Low, Marsten, 1899.

Voltaire, M de. The History of the Russian Empire and Peter The Great. 2 vols. London: J. Norse and P. Valliant, 1749.

Waliszewski, L. Peter The Great. Tr. Lady Marcy Loyd. New York: Appleton, 1897.

Wallace, Donald M. Russia. 2 vols. New York: Cassell Peter and Galpin, 1877.

Weber, F. C. The Present State of Russia. 2 vols. Tr. from High Dutch. London: W. Taylor, 1723.

Wenyon, Charles. Across Siberia on the Great Post-Road. London: C. H. Kelly, 1896.

Westwood, J. N. A History of Russian Railways. London: G. Allen and Unwin, 1964.

_____. Soviet Railways of Today. New York: Citadel Press, 1964.

Whishaw, Fred J. Out of Doors in Tsarland. London: Longman and Green, 1893.

White, W. C. Made in Russia. New York: Knopf, 1904.

Wohl, O. W. The Land of the Czar. London: Chapman and Hall, 1875.

Young, Edward. Labor in Europe and America. Philadelphia: S. A. George, 1875.

Zadvorny, Leonid. Motorist's Guide to the Soviet Union. Tr. Barry Jones. Moscow: Progress Publishing House, 1980.

Articles in English

Abramson, A. von. "The State of Town Drainage in Russia," Van Nostrand's Engineering Magazine 32 (Jan.-June 1885): 471-72.

Agthe, Adolf. "Pontoon Bridge Over the Duna at Riga," Minutes of the Proceedings of the Institute of Civil Engineers 22 (1895): 426-28.

The Annual Registry for 1824 (1825): p. 157.

"Automobile Conditions in Southern Russia." The Horseless Age 32 (July 1913): 7.

Bartholomew, E. G. "Roads and Canals," The Technical Educator 1 (1872): 314-15.

Bigelow, Pouney. "The Siberian Railway," Contemporary Review 63 (Jan.-June 1893): 248-62.

Blake, William. "The Blake-Stone Ore Breaker," Transaction of the American Institute of Mining Engineers 33 (1902): 988-1031.

Bodin, P. "Bridge over the River Neva at St. Petersburg," Minutes of the Proceedings of the Institute of Civil Engineers 57 (1904): 396.

Bookshpan, J. "The Internal Trade of Russia," in Russia, Its Trade and Commerce. Ed. A. Raffalovich. London: P. S. King, 1918.

"Bridges Built by . . . Pain," Soviet Weekly. 2,077 (Nov. 28, 1981): 2.

"Budget of the Empire for 1900," Russian Journal of Statistics (1901): 305-15.

Burnaby, F. "A Journey by Sleigh," in Russia Described by Great Writers. Ed. E. Singleton. New York: Dodd and Mead, 1906.

"Canals and Roads," Hunt's Merchant's Magazine 9 (July-Dec. 1843): 483.

Clark, Charles. "Commercial Guilds of Russia," Hunt's Merchant's Magazine 6 (1842): 37-42.

Closterhalfen, B. "The Siberian Highway," Minutes of the Proceedings of the Institute of Civil Engineers (1893): 448-51.

"Cold Storage in Russia," The British Trade Journal 41 (1903): 171.

Collins, Perry. "Explorations of the Amoor River," Harper's 17 (1858): 221-32.

"Commerce of South Russia," Hunt's Merchants Magazine 37 (Aug. 1857): 147-58.

"Corea and the Siberian Railway," Littell's Living Age 9 (Jan.-March 1896): 131-39.

Crisp, Olga. "Labor and Industrialization in Russia," in The Cambridge Economic History, Vol. 7, Pt. 2, 1978.

"Department of Manufacturer," De Bow's Review 12 (Jan. 1852): 91-103.

Drake, Frank. "The Manganese-Ore Industry of the Caucasus," Transaction of the American Institute of Mining Engineers (1898): 191-208.

Durban, William. "The Trans-Siberian Railroad," The Contemporary Review 86 (July-Dec. 1899): 261-71.

"Earth-Bed," The Great Soviet Encyclopedia, Vol. 9. Ed. A. M. Prokhorov. Moscow: Soviet Encyclopedia Publishing House, (1970): 67-68.

"Ease of Traction on Pavements of Different Kinds," The Manufacturers and Builders 21 (1889): 272.

Edwards, H. S. "Self-Government in Russia," Littell's Living Age 126 (July-Sept. 1875): 753-61.

"The Emancipation of the Serfs," The Cornwall Magazine 3 (Jan.-June 1861): 367-73.

The Encyclopedia Britannica. 1911, pp. 389, 391.

"Facts About the Soviet Union," Soviet Weekly 1,992 (April 12, 1980): 2.

"The French in Russia," Niles' Weekly Register 3 (Sept. 1812-March 1813): 254-55.

"French Road Building," The Manufacturers and Builders 25 (1893): 244-45.

Gerschenkron. A. "Problems and Patterns of Russian Economic Development," in The Transformation of Russian Society. Ed. C. F. Black. Cambridge, Mass.: Harvard University Press, 1960.

Gillette, Robert. "Spoilage Fails Soviet Food Supply." Tulas World, June 8, 1982, p. 32.

Gnusin, D. "The Port of Nicolaieff," Minutes of the Proceedings of the Institute of Civil Engineers 97 (1889): 430-31.

Goldman, Marshall. "The Relocation and Growth of the Pre-Revolutionary Russian Ferrous Metal Industry," in Explorations in Entrepreneural History 9 (Oct. 1956): 19-36.

"Good Roads," The Horseless Age 5 (March 1900): 600.

"Grain Transportation in Russia," The Railroad Gazette 24 (Jan. 1892): 314-15.

"The Great Fairs of Russia," Chamber's Magazine (1895): 550-53.

"A Great Russian Stud," Country Life Illustrated 8 (Aug. 1900): 136-39.

Hapgood, I. "The Nevesky Prospekt," Scribner's Magazine 12 (July-Dec. 1892): 301-22.

Harper's 71 (1871): 743.

Heard, Albert F. "Justice and Law in Russia," Harper's 76 (Dec. 1887-May 1888): 920-31.

"Highways," The Great Soviet Encyclopedia, Vol. 8. Ed. A. M. Prokhorov. Moscow: Soviet Encyclopedia Publishing House, p. 67.

The Horseless Age 22 (Feb. 1916): 114.

Hourwich, Isaac A. "The Crisis of Russia Agriculture," Yale Review 1 (May 1892-Feb. 1893): 411-33.

_____. "The Economics of the Russian Village," Studies in History 2 (1892-93): 1-182.

"Import Duties on Automobiles," The Horseless Age 11 (May 1903): 588.

"Internal Suffering of Russia from the War," Blackwood's Edinburg Magazine 78 (July-Dec. 1855): 249-58.

"Internal Trade of Russia," Hunt's Merchants Magazine 36 (Jan.-June 1857): 232, 757.

Kahan, Arcadius. "Capital Formation During the Period of Early Industrialization of Russia," in The Cambridge Economic History of Europe, Vol. 7, Pt. 2 (1978).

_____. "Continuity in Economic Activity and Policy During the Post-Petrine Period in Russia," The Journal of Economic History 25 (March 1965): 61-85.

_____. "Government Policies and the Industrialization of Russia," The Journal of Economic History 25 (March 1965): 61-85.

Kennan, George. "The Russian Muzhik," The Outlook 109 (March 1915): 680-83.

_____. "The Social and Political Conditions of Russia," The Outlook 76 (January 1904): 261-66.

Knox, T. W. "A Sleigh-Ride Through Eastern Siberia," Harper's 38 (Dec. 1868-May 1869): 289-304.

_____. "Traveling in Siberia," Harper's 37 (June-Nov. 1868): 449-62.

Kohl, J. G. "Sketches of Russian Commerce," Commercial Review 10 (March 1844): 207-17.

Kouznetzoff, Nicolas. "The Automobile Industry in Russia," The Autocar 36 (April-June, 1916): 421-22.

Kozhin, A. "Roads," The Great Soviet Encyclopedia Vol 5, Ed. A. M. Prokhorov. Moscow: Soviet Encyclopedia Publishing House, 1970.

Kropotkine, O. "Emperor Alexander's Reigns," Littell's Living Age 148-49 (Jan.-March 1881): 387-401.

Kropotkine, P. A. "Moscow," Encyclopedia Britannica, Vol. 21 (1886): 67-110.

_____. "On the Present Condition of Russia," The Outlook 58 (Jan.-April 1898): 113-17.

_____. "Outcast Russia," Littell's Living Age 60-61 (Jan.-March 1884): 184-91.

_____. "Russia," Encyclopedia Britannica (1883): pp. 856-60.

_____. "Russia," Encyclopedia Britannica 23 (1911): 869-911.

Lanin, E. B. (pseud.). "Famine in Russia," The Fortnightly Review 49 (Jan.-June 1891): 798-824.

_____. "The Tsar Alexander III," The Contemporary Review 63 (Jan.-June 1891): 798-824.

Lansdell, Henry. "Through Siberia, by Way of the Amur and the Ussuri," The Contemporary Review 38 (July-Dec. 1880): 557-83.

Laue, T. H. von. "The Witte System in Russia," The Journal of Economic History 13 (Fall 1953): 425-48.

Lessor, Paul. "The Kara-Kum, or Desert of Turkomania," Proceedings of the Royal Geographical Society 7 (1885): 231-38.

"Life in the Interior of Russia," Blackwood's Edinburg Magazine (September 1855): 270-87.

Lodge, Henry Cabot. "Some Impressions of Russia," Scribner's Magazine. 21 (Jan-June 1902): 570-80.

MacGowan, David B. "The Russian Lourdes," The Century Magazine 68 (September 1904): 665-79.

McPherson, Logan. "Transportation and Traffic in Russia," The Railway Age 49 (August 1910): 214-16.

"Many More Private Cars," Soviet Weekly 1,943 (May 5, 1979): 4.

Meeker, Ralph. "Through the Caucasus," Harper's 74 (1886-1887): 910-23.

"Moscow's First Public Transport," Soviet Weekly 2096 (April 10, 1982): 5.

"New Moscow Bridge," Soviet Weekly 2,016 (Sept. 1980): 4.

Nitze, H. B. C. and Purington, C. W. "The Katchkor Gold-Mines," Transaction of the American Institute of Mining Engineers 28 (1898): 24-32.

Norman, Henry. "Russia of Today," Scribner's Magazine 28 (Oct. 1900): 387-406.

Paul, Bill. "More States May Collect Tolls as Road Repair Needs Mount." The Wall Street Journal, June 22, 1982, p. 33.

"Pavement of the Future," The Manufacturers and Builders 25 (1893): 279-80.

"Personal Memoirs of the House of Romanoff," Harper's 10 (1854-55): 195-215.

"Pictures from St. Petersburg," Blackwood's Edinburg Magazine 20 (1851): 154-172.

"Plan Long Russian Road Contest," The Horseless Age 33 (May 1914): 113.

Polster, Captain von. "Special Power Trucks in Use in the Russian Army," The International Military Digest, 1915.

Pope, Albert. "The Economy of Good Roads," The Outlook 58 (Jan.-April 1898): 168-71.

"Postage Stamps and Their Origin," Harper's 43 (1871): 741-50.

Potter, Isaac B. "The Common Roads of Europe and America," The Engineering Magazine 1 (1891): 615-16.

Proctor, Edna D. "Northern Russia and St. Petersburg," Scribner's Magazine 5 (Nov. 1872): 1-21.

The Quarry 21 (Nov. 1916): 263.

"Railway Notes," The Engineering Magazine 25 (July-Dec. 1881): 654.

"The Railways of the World," The Banker's Magazine 22 (1867-1868): 660-61.

Ravenstein, E. G. "The Russians on the Amur." Bentley's Miscellany 41 (1857): 551-62.

"The Reorganization of Russia," Littell's Living Age 24 (Aug. 1904): 384-98.

Rimlinger, Gaston V. "The Expansion of the Labor Market in Capitalist Russia, 1861-1917," The Journal of Economic History 21 (June 1961): 208-15.

"Road Conditions in Russia," Good Roads 2 (Nov. 1911): 228.

"The Road Mileage of the Russian Empire," Good Roads 13 (Jan. 1917): 13.

"Roads and Streets," Encyclopedia Britannica Vol. 23, 1911, pp. 388-94.

"Roads in Russia," Penny Magazine (1842): p. 32.

"Road Systems of Foreign Countries," The Official Good Roads Yearbook of the United States (1914): 13-18.

"The Russian Budget for 1900," The Russian Journal of Statistics (1901): 312.

"Russian Railway Bridges," Van Nostrand's Engineering Magazine 4 (Jan.-June 1871): 55-56.

Shiskoff, N. "The Horrors of Hunger," The Nineteenth Century 179 (Jan. 1892): 1-6.

"Siberia," Blackwood's Edinburg Magazine 54 (July-Dec. 1848): 76-91.

"Siberia," De Bow's Review 14 (1852): 19-45.

"Siberia and the Penal Settlements," Littell's Living Age 30 (July-Sept. 1951): 241-56.

Steveni, W. B. "Russian Village Industries," The Contemporary Review 121 (March, 1872): 338-43.

"Street Paving Statistics," The Manufacturers and Builders 23 (1891): 112.

Thalheim, Karl C. "Russia's Economic Development," in Russia Enters the Twentieth Century, 1894-1917. Ed. G. Katov. London: Temple Smith, 1916.

Tien-Shansky, D. "Russia, Territory and Population," Geographical Review 18 (1928): 616-40.

"To School in a Taxi," Soviet Weekly 2054, June 20, 1981, p. 15.

"Tours in the Russian Empire," The Quarterly Review 68 (Dec.-March 1841): 344-75.

"A Trial of Cars for the Russian Army," The Autocar 38 (Jan. 1917): 7.

Twain, Mark. "Americans on a Visit to the Emperor of Russia," Littell's Living Age 95 (Oct.-Dec. 1867): 59-63.

"The Two Speransky," Blackwood's Edinburg Magazine 115 (Feb. 1874): 157-71.

Whitman, Sidney. "One Day in Russia," The Gentleman's Magazine 267 (Jan.-June 1890): 604-14.

"Wood Pavement," The Popular Science Monthly 1 (Nov. 1876-April 1877): 118.

Yates, A. C. "A Journey to Tashkent," The Scottish Geographical Magazine 7 (1891): 57-75.

Young, John R. "Russia," in Around the World with General Grant Vol. 1. New York: The American News Company, 1879.

Zaborsky, K. and Gudanov, E. "Internal Transport," in Russia: Its Trade and Commerce. Ed. A. Raffalovich. London: Orchard House, 1918.

GOVERNMENT DOCUMENTS IN ENGLISH

Baker, Henry D. "Russian Market for American Hardware," U.S. Dept. of Commerce. Miscellaneous Series, No. 46. Bureau of Foreign and Domestic Commerce. Washington, D.C.: Government Printing Office, 1916.

British Foreign Office. Commercial Reports from Her Majesty's Consuls. "Russia, Report for the Year 1901." No. 2860. London: Both Houses of Parliament, 1902.

_____. Commercial Reports from Her Majesty's Consuls. "Russia, Report for the Year 1904." No. 3351. London: Both Houses of Parliament, 1905.

British Consular Reports. 1867. pp. 628-29.

Crawford, John N. "Streets and Highways in Foreign Countries." U.S. Dept. of State.

Report No. 139. Bureau of Statistics. Washinton, D.C.: Government Printing Office, 1892.

Great Britain. Intelligence Department, Naval Staff. A Handbook of Siberia and Arctic Russia, vol. 1 (1918).

House of Representatives. "Russia." In Commercial Relations of the United States. 44th Congress, First Session. Washington, D.C.: Government Printing Office, 1875.

Rubinow, I. M. "Economic Conditions of the Jews in Russia," U.S. Dept. of Commerce and Labor. Bulletin of the Bureau of Labor, Vol. 15, Washington, D.C.: Government Printing Office, 1907.

_____. "Russia's Wheat Surplus: Conditions Under Which It Is Produced." U.S. Dept. of State. Bulletin No. 65, 1908 and Bulletin No. 66, 1908. Washington, D.C.: Government Printing Office.

The Royal Commission on Labour. Reports on Labour Questions in British Colonies and Foreign Countries. British Parliamentary Papers, Pt. 2. London: 1893-94.

Snodgrass, John N. "Railway Rates, Inland Waterways and Canals in the Russian Empire." U.S. National Waterway Commission, Document No. 22, Washington, D.C.: Government Printing Office, 1911.

U.S. Dept. of Agriculture. "Conditions of Crops in America and Europe," Report of the Statistician, Document No. 66, Washington, D.C.: Government Printing Office, 1889.

U.S. Joint Committee on Federal Aid in the Construction of Post Roads. "Public Road Systems of Foreign Countries and Several States." Washington, D.C.: Government Printing Office, 1913.

U.S. State Department. "Russian Agriculture and Cereal Trade." Bureau of Statistics, Report No. 106. Washington, D.C.: Government Printing Office, 1889.

_____. "Russia." In Commercial Relations of the United States, Bureau of Foreign Commerce. Washington, D.C.: Government Printing Office, 1897.

_____. "Russia." In Commercial Relations of the United States, Bureau of Foreign Commerce, Vol. 2. Washington, D.C.: Government Printing Office, 1909.

_____. "Trade and Industries of Russia." Bureau of Statistics, Report No. 93. Washinton, D.C.: Government Printing Office, 1888.

RUSSIAN SOURCES

Bolshaya Entsiklopediya. "Rossiya." Slovar obshchedostupnkh svedenii po vsem otraslyam snaiya. Shestnadtsati Tom. Izdateli Knigoizdatelskogo Tovarishchestva Prosvetschenie. St. Petersburg, 1896.

_____. "Shosse." Slovar obshchedostupnkh svedenii po vsem otraslyam snaiya. Dvadtsati Tom. Izdateli K.T.P. St. Petersburg, 1909.

Entsiklopedicheskii Slovar. "Doroga." Tom. 23. Izdateli F. A. Grogaus and I. A. Efron. St. Petersburg, 1893.

Karta tamoshennkh uchvezhdenii Rossii no svdiyam k. Yanvaraya 1886 g. St. Petersburg, 1886.

Karta zhelznkh shosseinkh i vnutrennkh vodnkh. Putei Soobshcheniya Evropeiskoi Rossii. Izdanie Ministerstva Putei Soobshcheniya 1905 g. St. Petersburg, 1905.

Klimatologicheskii Atlas SSSP. Sostavlen Institutom Klimatologii. Glavnaia Geofizicheskaia Observatorii. Vpusk III. Izdanie Gosplana SSSR i GMK SSSR i RSFSO. Leningrad, 1933.

Ministerstvo vnutrennkh diel. chisiennost i sostav rabochikh v Rossii na o snovanii dannykh pervoi useobshchei. Perepisi Naselenia Rossiiskoi Imperii 1897 goda. St. Petersburg, 1906.

Sbornik Imperatorskogo Russgogo Istoricheskogo Obshchestva. "Istoricheskoe obozrenie putei soobshcheniia i publichnvk zdanii s 1825 po 1850 g. Tom. 98. St. Petersburg, 1896.

Semenov, A. Izuchenie Istoricheskikh Svedenii O Rossiiskoi Vneshnei Torgovle i Promshlennosti S Polovin Kup Stoletiva Po 1858 god. St. Petersburg, 1859.

Shchepotev, S. "Shosseinya i gruntovya doroga." Entsiklopedicheskii Slovar. Tom. 27. Izdateli F. A. Brogaus and I. A. Efron. St. Petersburg, 1899.

Soloveva, Aida M. Zheleznodorozhnyi Transport Rossii vo Vtoroi Polovine XIX v. Moscow, Akademiya Nauk SSSR, Institut Istorii SSSR.

Statistischeskii Ezhegodnki Rossii 1907. Izdanie tsentralnago statisticheskago komiteta, M.V.D. St. Petersburg, 1908.

_____ 1908. T.S.K. St. Petersburg, 1909.

_____ 1909. T.S.K. St. Petersburg, 1910.

_____ 1910. T.S.K. St. Petersburg, 1911.

_____ 1913. T.S.K. St. Petersburg, 1914.

Statistika Rossiiskoi Imperii Sbornik Svedenii Po Rossii 1896. Tom 40. Tsentralnii statisticheskii komitet, ministervsta vnutrennikh del. St. Petersburg, 1897.

Statisticheskii Sbornik. Ministerstva ot putei soobshcheniya. Vupusk Vtoroi. zhelznykh vodyankh i shosseeynkh putyakh soobshcheniya 1875 i 1876. Izdanie ministerstva putei soobshcheniva. St. Petersburg, 1897,

Tanenbaum, A. "Shosse." Entskilopedicheskii Slovar. Tom. 39. Izdateli F. A. Brogaus and I. A. Efron. St. Petersburg, 1903.

Tsentralnyi statististicheskii komitet. Pervaia Vseobshchaia Perepis Naselniia Rossiiskoii Imperii 1897 g. Volumes 1-89. St. Petersburg, 1899-1904.

Yanovskii, A. "Doroga," Entskilopedicheskii Slovar. Tom. 23. Izdateli F. A. Brogaus and I. A. Efron, St. Petersburg, 1893.

U.S. Dept. of Commerce. "Expenditures on Road Building." Bureau of Foreign and Domestic Commerce, Report No. 234. Washington, D.C.: Government Printing Office, 1913.

_____. "Russia: A Handbook on Commerce and Industry." Special Consular Report No. 61. Bureau of Foreign and Domestic Commerce. Washington, D.C.: Government Printing Office, 1913.

U.S. Dept. of Commerce and Labor. "Annual Russian Contract Fairs." Bureau of Manufacturers, Report No. 118. Washington, D.C.: Government Printing Office, 1911.

_____. "Appropriation for Road Building in Russia." Bureau of Manufacturers, Report No. 169. Washington, D.C.: Government Printing Office, 1916.

_____. "Russia." Bureau of Foreign and Domestic Commerce, Report No. 258. Washington, D.C.: Government Printing Office, 1904.

_____. "Traveling in Russia." Bureau of Foreign and Domestic Commerce, Report No. 133. Washington, D.C.: Government Printing Office, 1910.

U.S. Dept. of Labor. Fifteenth Annual Report of the Commissioner of Labor. 2 vols. Washington, D.C.: Government Printing Office, 1900.

_____. "Workmen's Insurance and Compensation Systems in Europe." 2 vols. Twenty-fourth Annual Report of the Commissioner of Labor. Washington, D.C.: Government Printing Office, 1911.

DISSERTATIONS

Burstein, Abraham C. "Iron and Steel in Russia, 1861-1913." Ph.D. dissertation, New School for Social Science, 1963.

Lauber, Jack M. "The Merchant Gentry Conflict in Eighteenth Century Russia." Ph.D. dissertation, University of Iowa, 1967.

Lipski, Alexander. "Russia Under Ivanova." Ph.D. dissertation, University of California, 1953.

MISCELLANEOUS

Brandt, William. "Correspondence Letters. From Archangel, September 29, 1822." University of Illinois Archives, Samuel H. Brandt Collection, 1807-1842, 1889.

London Times. June 28, 1879, p. 7.

New York Times. 1883, p. 3.

LIST OF ABBREVIATIONS

AAC: Appleton's American Cyclopedia

BE: Bolyshaya Entsiklopediya

BEM: Blackwood's Edinburg Magazine

CLI: Country Life Illustrated

CR: Consular Reports

DBR: De Bow's Review

FO: Foreign Office

GR: Good Roads

HM: Harper's Magazine

HMM: Hunt's Merchant Magazine

IC: International Cyclopedia

IR: International Review

LLA: Littell's Living Age

MPICE: Minutes of the Proceedings of the Institute of Civil Engineers

NS: Naval Staff

NWR: Niles Weekly Register

NYT: New York Times

PM: Penny Magazine

RA: Russian Almanac

RJS: Russian Journal of Statistics

RR: Review of Review

RYB: Russian Year-Book

ABBREVIATIONS (cont.)

SE: Statistishcheskoi Ezhegonik

SIRIO: Sbornik Imperatorskogo Russkogo Istoricheskogo Obshchestva

SR: Statistika Rossiiskoi

SS: Statisticheskii Sbornik

SW: Soviet Weekly

TAAC: The American Annual Cyclopedia

TAIME: Transaction of the American Mining Engineers

TAR: The Annual Registry

TBCL: The British Commission on Labour

TBM: The Banker's Magazine

TBTJ: The Board of Trade Journal

TCM: The Cornwall Magazine

TCR: The Contemporary Review

TEB: The Encyclopedia Britannica

TEM: The Engineering Magazine

TER: The Edinburg Review

TGM: The Gentleman's Magazine

TGSE: The Great Soviet Encyclopedia

TLD: The Literary Digest

TMB: The Manufacturers and Builders

TNMM: The New Monthly Magazine

TPSM: The Popular Science Monthly

ABBREVIATIONS (cont.)

TQ: The Quarry

TRA: The Railway Age

TRG: The Railway Gazette

TRT: The Railway Times

TSGM: The Scottish Geographical Magazine

TSS: The Secretary of State

TSY: The Statesman's Year-Book

TTE: The Technical Educator

VNEW: Van Nostrand's Engineering Magazine

YR: Yale Review

THE ROLE OF HIGHWAYS AND LAND CARRIAGE IN TSARIST RUSSIA

BY: PAUL SHOTT

MAJOR PROFESSOR: GARY L. THOMPSON, Ph.D.

The purpose of this study is to describe and explain the role, influences, and effects of highways over land carriage in the development of the Old Russian economy. For centuries, Russia had few choices but to transport merchandise by land routes, In summer and winter, small animal-drawn vehicles and sleds carried the goods of the empire to local and distant markets.

Russia was not a roadless nation-state. On the contrary, it was a country with public highways and post-roads, divided into categories, each with specific construction codes and maintenance procedures. An intricate bureaucracy was spawned to supervise and manage these roads and highways. The decision to collapse distances and increase transport efficiency with steam railways was a significant development. Macadam surfaces declined precipitously, never to recover.

Despite the fact that a system of paved and unpaved roads evolved, land transportation was less than satisfactory. Traveling and land carriage were slow, tedious, and expensive. The effects of rasputitsa (season of the mud) were a significant impediment to uninterrupted land transportation. An immense amount of capital, labor, and resources went into land

carriage and a minimum amount into highway construction. Every facet of Russian society was touched in some manner by gound transportation ability. The effects of roads and and highways in inhibiting the modernization of Tsardom was of great significance.